JUNE 28 - 30, 2005 NORFOLK CONVENTION CENTER

Architecture: The Foundation for FORCEnet

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Deputy, Architecture and Human Systems Department

SPAWAR 052

30 June 2005

Sponsored by
SPAWARSYSCOM
FORCEnet Chief Engineer

Agenda

- **FORCEnet Architecture Overview**
  - CDR Pat Roche, SPAWAR
- **Governance and Operational Architecture**
  - Mr. Larry Core, NETWARCOM
- **System Architecture**
  - CDR Pat Roche, SPAWAR
- **Technical Architecture**
  - Mr. Mike Stewart, SPAWAR
- **Reference Model/SOA**
  - CDR Pat Roche, SPAWAR
- **Questions**

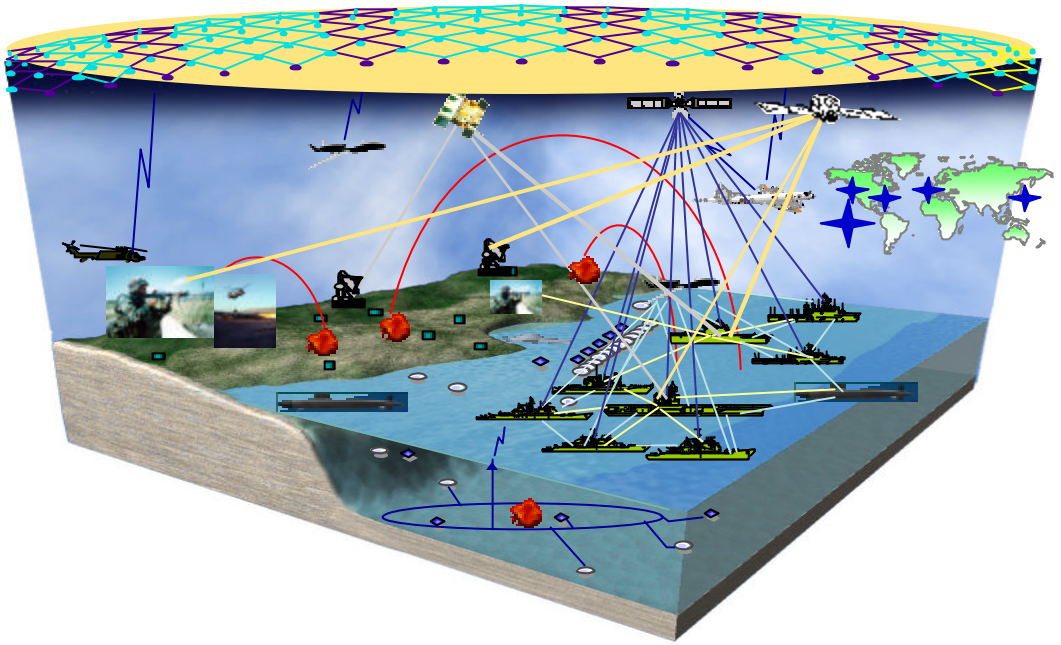
What is FORCEnet?

Network Centric Warfare is the theory.

Net-Centric Operations is the concept.

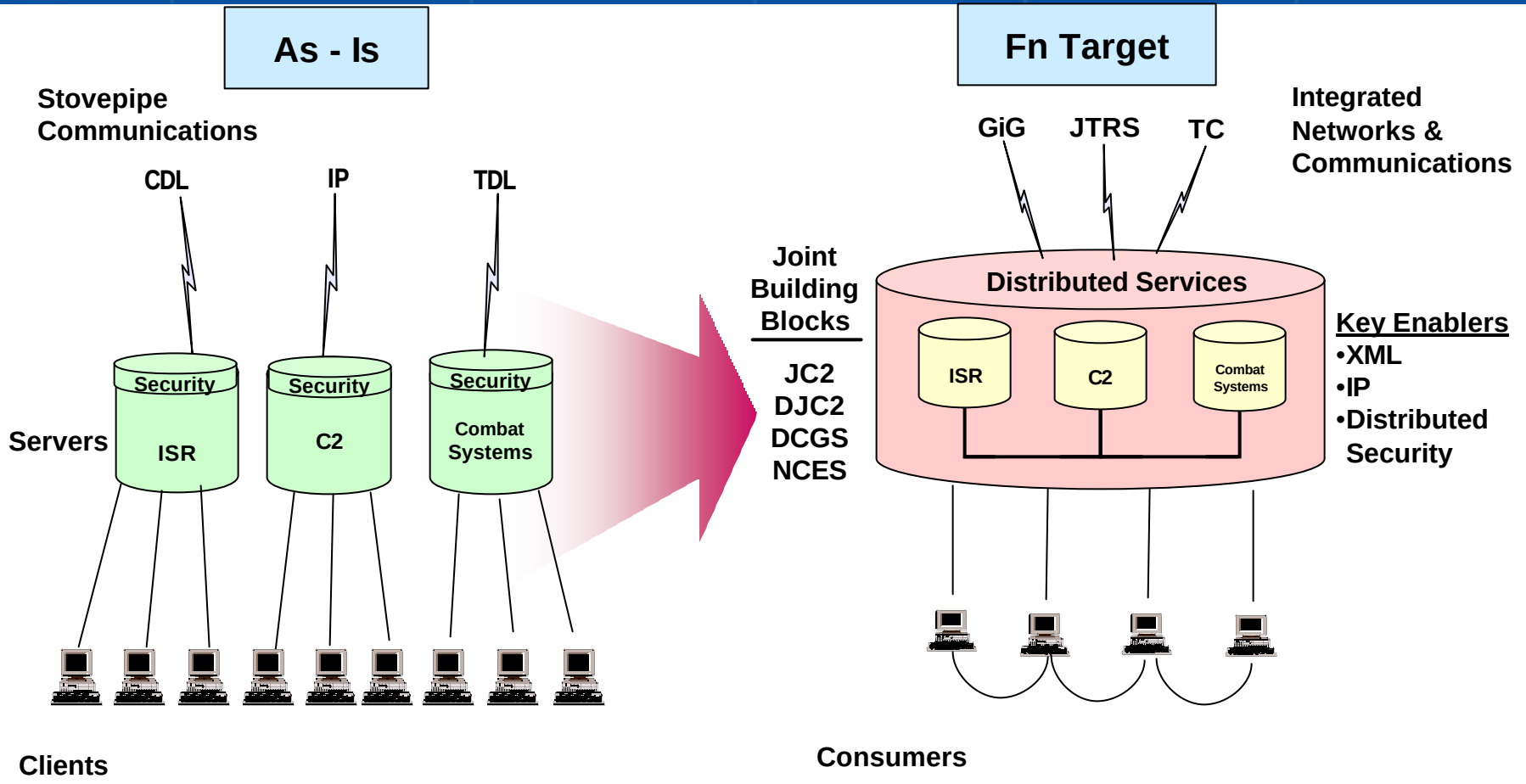
FORCEnet is the process of making the theory and concept a reality.

"FORCEnet is the operational construct and architectural framework for Naval Warfare in the Information Age which integrates Warriors, sensors, networks, command and control, platforms and weapons into a networked, distributed combat force, scalable across the spectrum of conflict from seabed to space and sea to land."*



*CNO's Strategic Study Group - XXI definition from 22 July 02 CNO Briefing

Push to a Common Environment

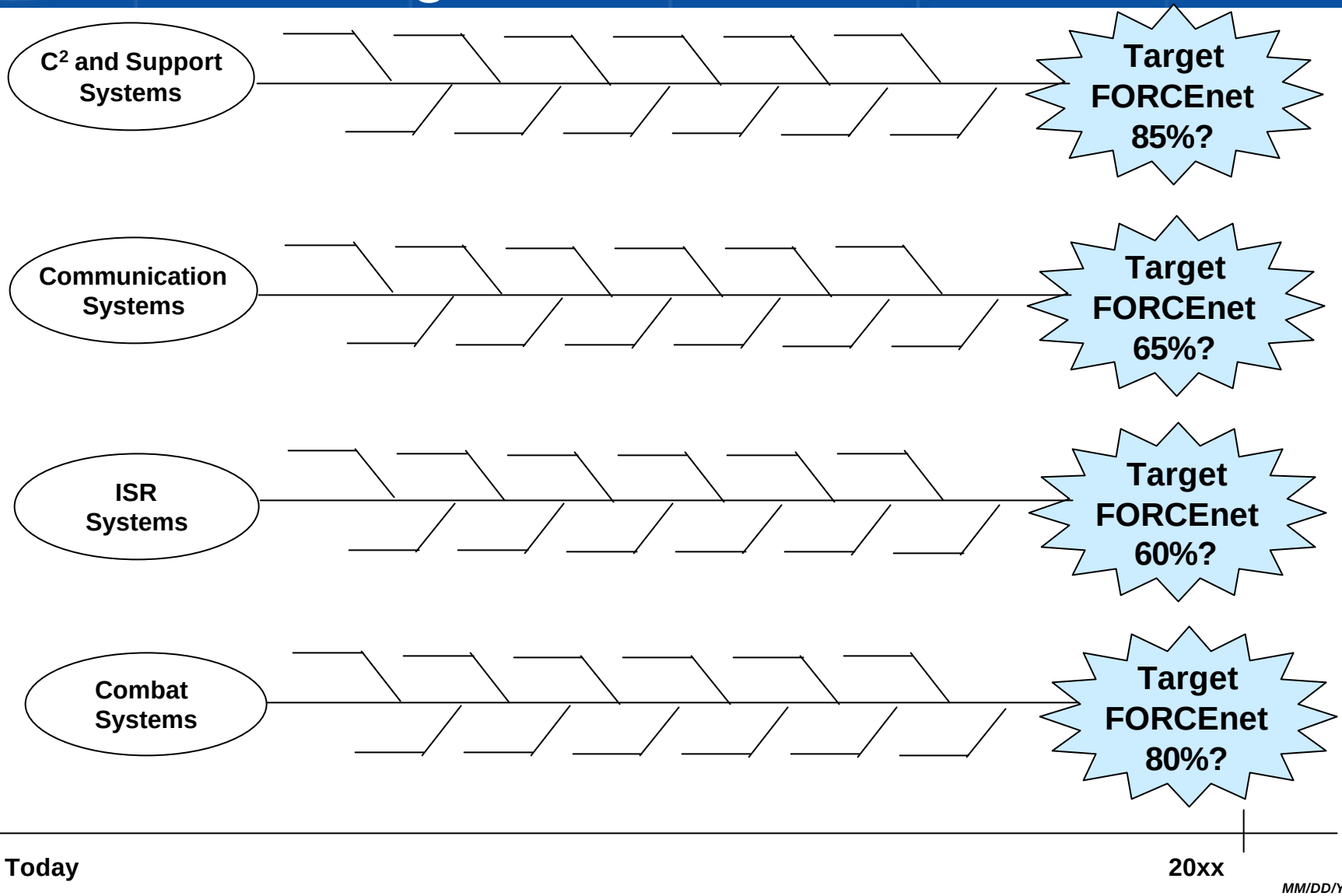


Purpose of FORCEnet Architecture

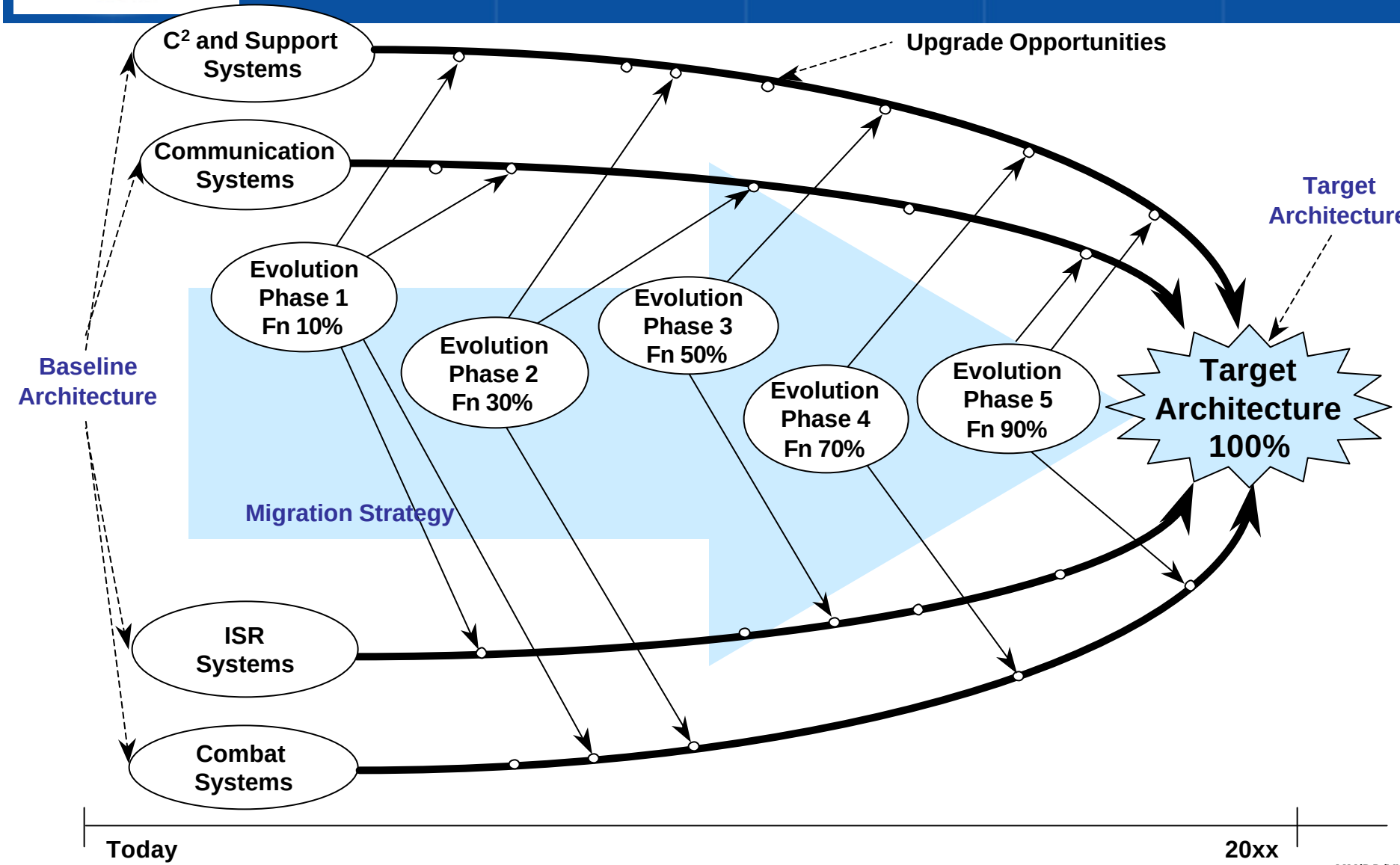
- **Architecture Data is Used to Describe**
  - What Exists Today (As-Is) Plus Planned/Programmed (To-Be)
  - What Should Exist in the Future (Target)
- **FORCEnet Integrated Architecture Data Supports the Naval Enterprise:**
  - NCDP
    - Warfighters
    - Resource Sponsors
  - Acquisition Community
    - Acquisition and Technology Managers
    - Solution Developers

Goal: Provide the Objective Data Needed to Support the Decision-Making Process

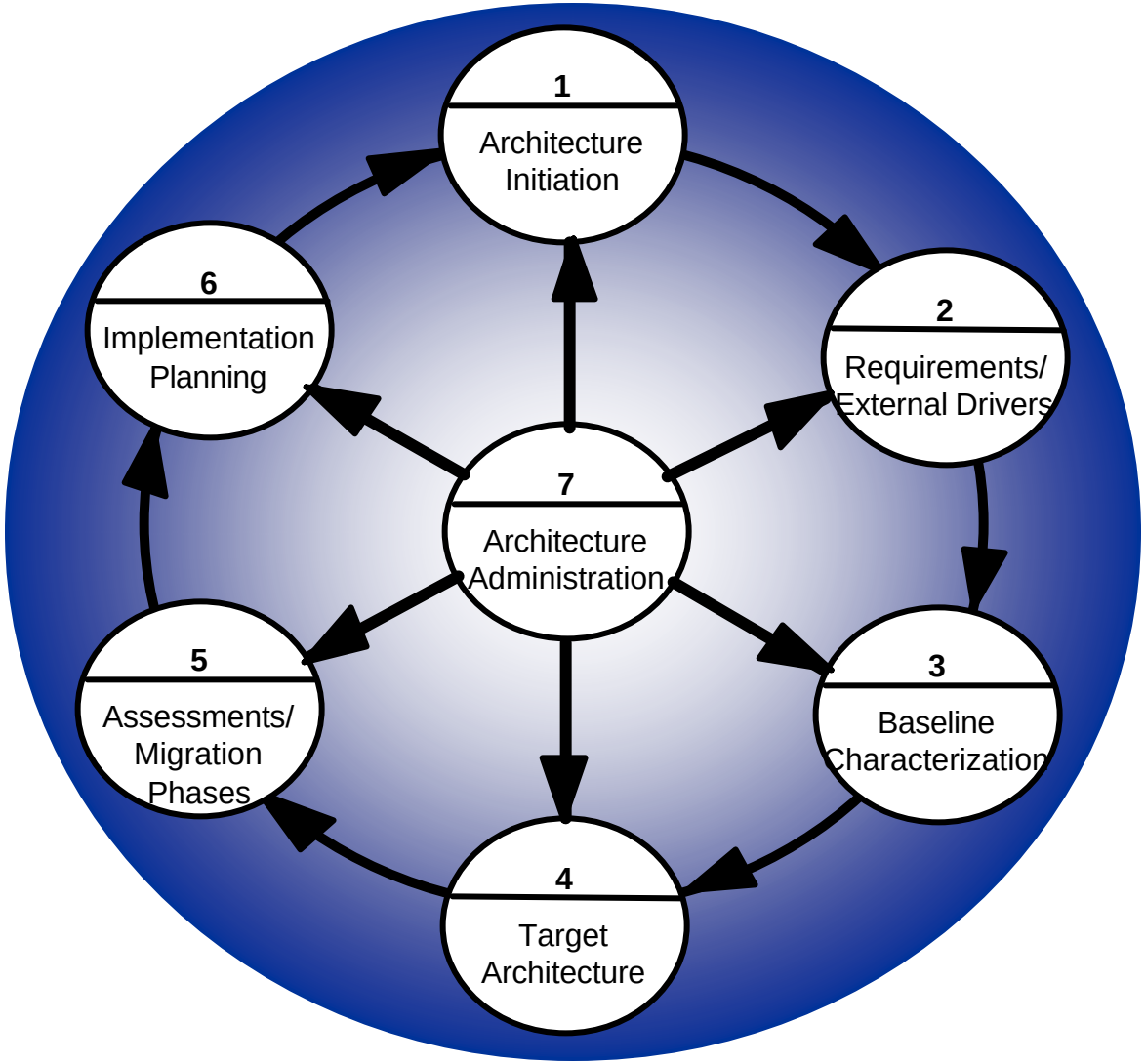
What Are We Trying to Fix With a Target Architecture?



An Enterprise Approach



Architecture Growth



Process adapted from "A Practical Guide to Federal Enterprise Architecture"

by Chief Information Officer Council Version 1.0 Feb 2001

Synchronization

- **Day 2 "Take-Aways"**
  - Many Initiatives
    - The "How"
  - Enterprise-Wide Scope
  - Many Initiatives (again)
  - Service-Oriented Implementation at Many Levels
- **"Threads" to Day 3**
  - One Umbrella
    - The "What"
  - Comprehensive Plan
  - Policy and Governance
  - Enterprise SOA Planning

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Topics

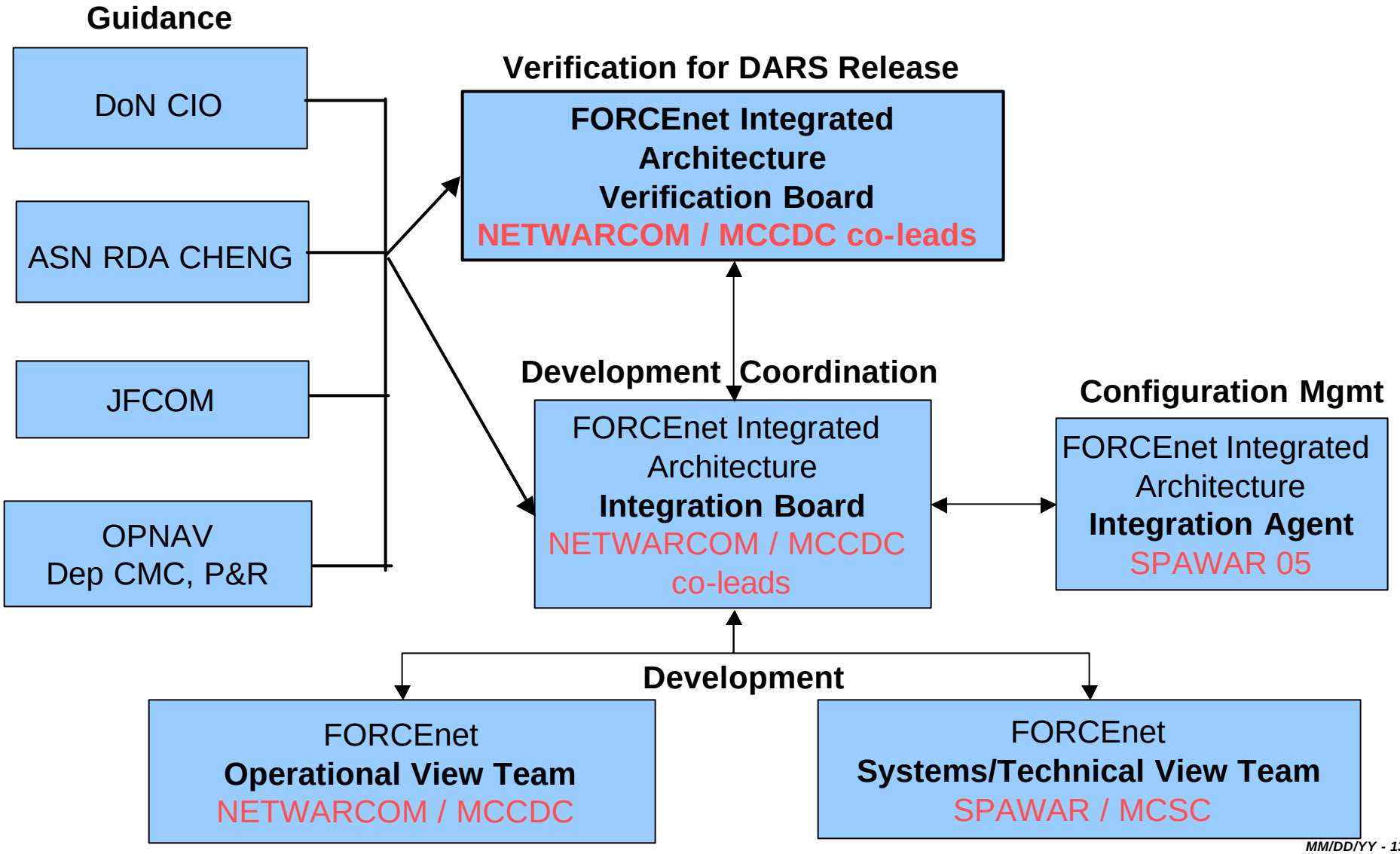
FORCEnet Integrated Architecture:

- Historical Context
- Governance
  - Structure
  - Process
- Operational View
  - Process
  - Products
  - Schedule

FORCEnet Integrated Architecture History

- **Dec 2003** – Sea Trial Instruction established NETWARCOM as Operational Agent for FORCEnet
- **Feb 2004** – NETWARCOM given Deep Dive Action to create plan for Operational View (OV) Development and Architecture Governance. Concept effort started
- **May/June 2004** – OV Plan and Architecture Governance presented at Deep Dive and Flag Summit
- **July 2004** – Monthly AV and OV Working Groups started
- **August 2004** – First Draft of AV-1 and Governance Document
- **Sept 2004** – Monthly SV Working Group started
- **Feb 2005** – FORCEnet Functional Concept signed by CNO and CMC
- **March 2005** – Monthly Integration Board started
- **April / June 2005** - Verification Boards

FORCEnet Integrated Architecture Governance Structure

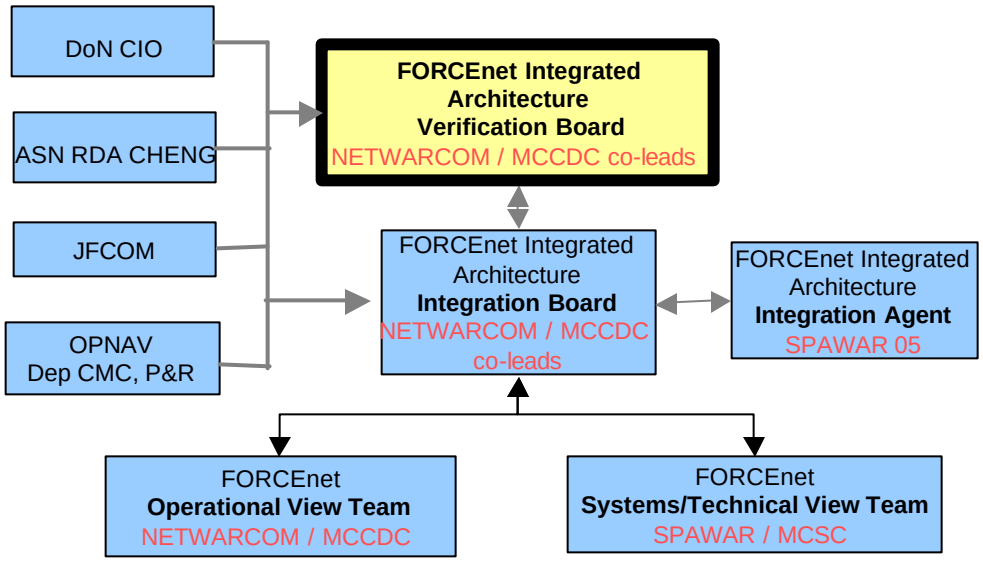


Verification Board

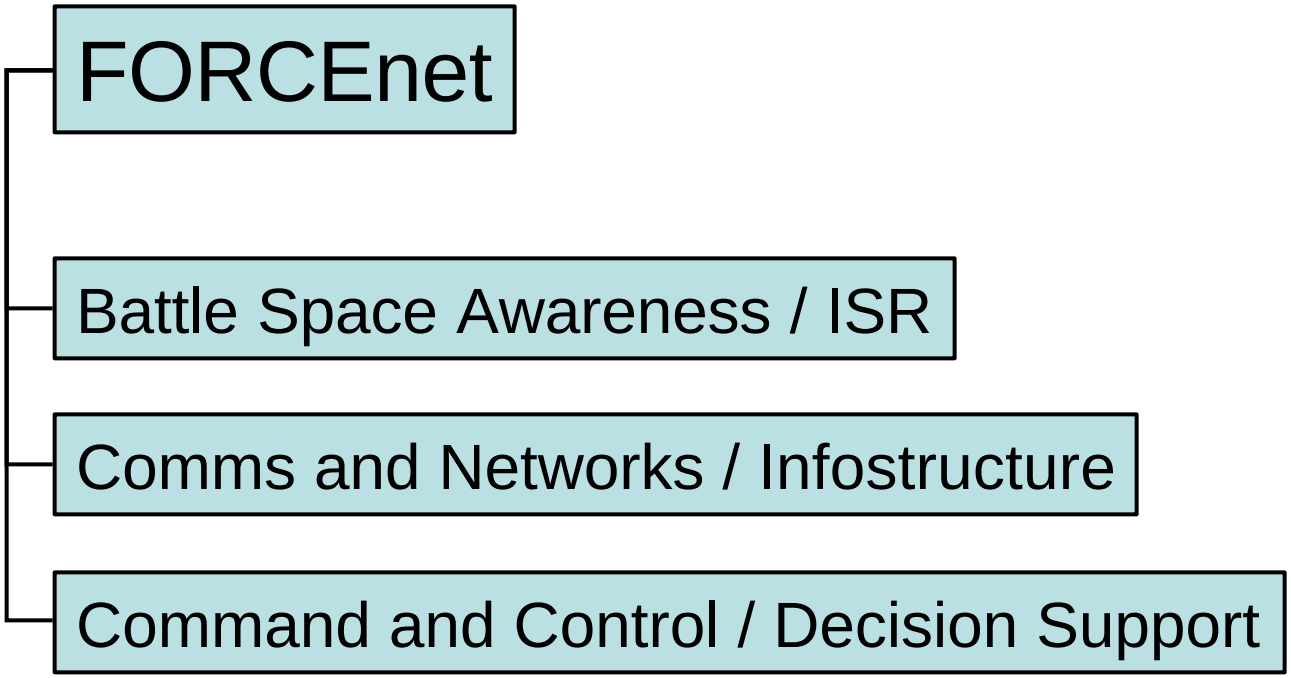
- Mission: Verify FORCEnet Integrated Architecture products are ready for release to the DOD Architecture Repository System (DARS)
- Evaluation Criteria:
  - Maturity
  - DODAF compliance
  - Correct representation of the FORCEnet Functional Concept / other authoritative sources
- Voting:
  - 2/3 Quorum
  - 2/3 Majority vote
- Decisions:
  - Direct product configuration management and DARS release
  - Direct additional work

Verification Board Membership

1. NNWC (Co-Chair) – CAPT Zalaskus
2. MCCDC (Co-Chair) – Marty Westphal
3. SPAWAR – Craig Madsen
4. MCSC – Michael Halloran
5. OPNAV N71 – LCDR Corsano
6. OPNAV N704 – LCDR Pelton
7. OPNAV N20 – LCDR Rabitor
8. NWDC – CAPT Babb
9. Dep CMC, PP&O - Major Hesser
10. Dep CMC, P&R – LtCol Bywaters
11. Dep CMC, Aviation - Major Logan
12. Dep CMC, I&L - Carl Beeler
13. Director, HQMC C4 - Col Thomas
14. Director, Intel - Doug Corum
15. RDA CHENG – Nehal Shah
16. DoN CIO – Michael Jacobs
17. ONR – Joe Martin



FORCEnet Integrated Architecture Structure



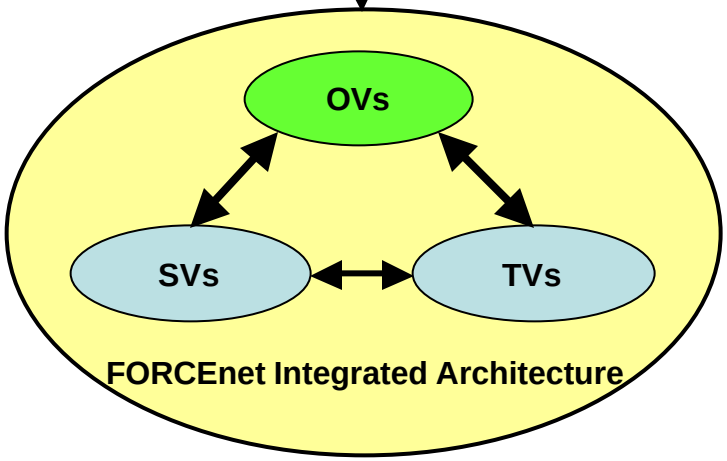
Capabilities Based Process

Naval Operating Concept for Joint Operations

FORCEnet Functional Concept / Capabilities

FORCEnet Functional Concept Capability Addendum

Operational Scenarios / Mission Threads



OV – Operational View

SV – System View

TV – Technical View

Operational View (OV) Process

FORCEnet engineering conference

FORCEnet Concept and Capabilities

Operational Scenarios/Mission Threads

- **Current Doctrine**
- **Mission Essential Tasks**
- **MCASE**

OV-1's

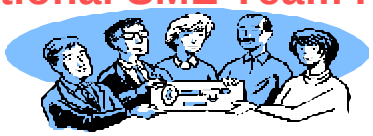
OV-2
OV-3
OV-4
OV-5

OV-6's

- FIBL
- MCASE
- M&S Based Assessments
- SV / TV Development
- POR: ISPs, ICDs CDDs, CPDs
- Experimentation Support

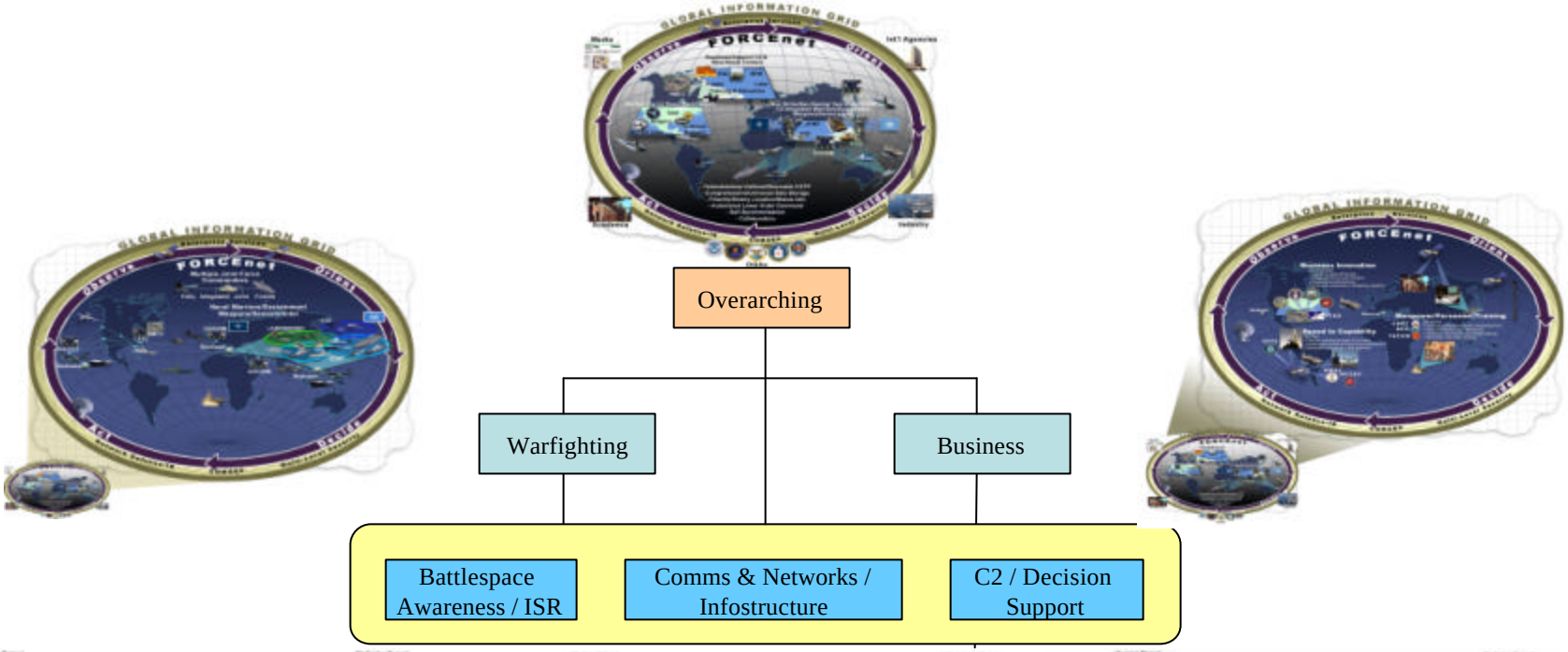
OV-1: High-Level Concept Graphic
OV-2: Operational Node Connectivity
OV-3: Information Exchange Matrix
OV-4: Organizational Relationships
OV-5: Activity Node Tree/Model
OV-6: Event Trace Diagram
FIBL – FORCEnet Implement. Baseline
SME – Subject Matter Expert
MCASE – MC Arch Support Environment

Operational SME Team Review



OV-1 Tier Structure

(High Level Concept Graphics)

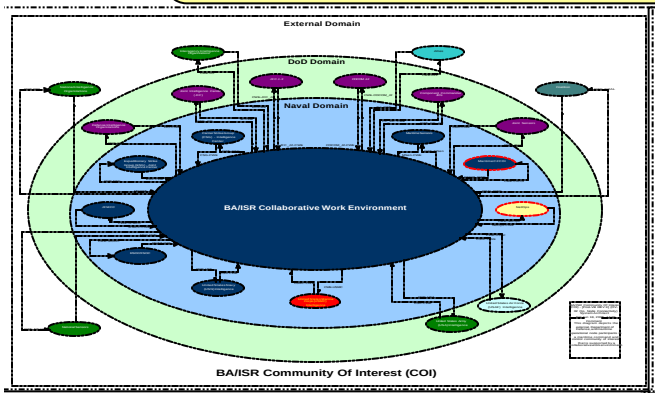


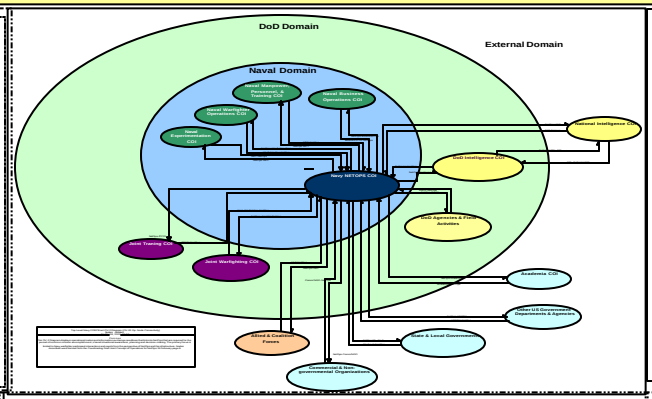
OV-2, 4, 5

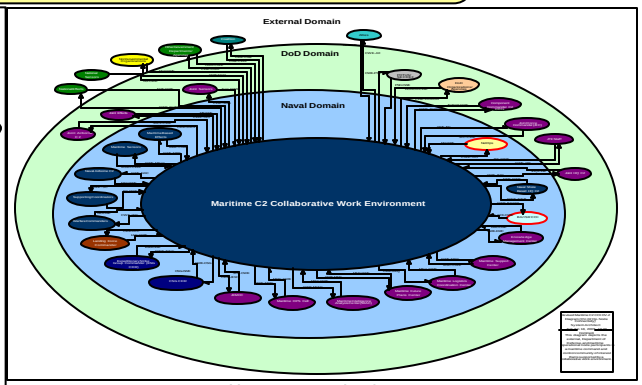
(Op Node Connectivity, Command Relationship, Activity Decomposition)

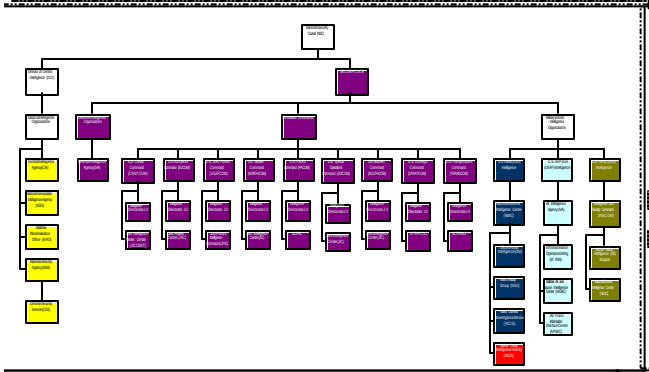
FORCEnet engineering conference

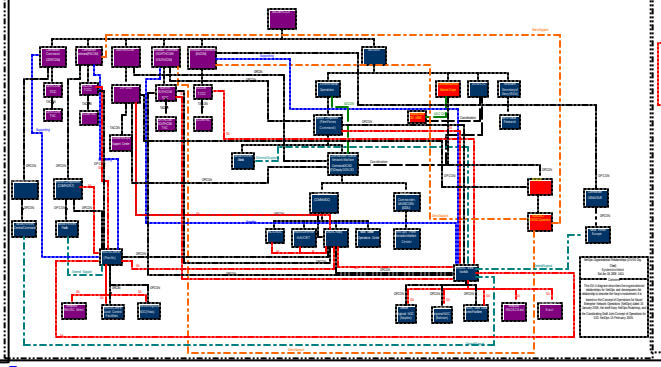
Battlespace Awareness / ISR | **Comms & Networks / Infostructure** | **C2 / Decision Support**

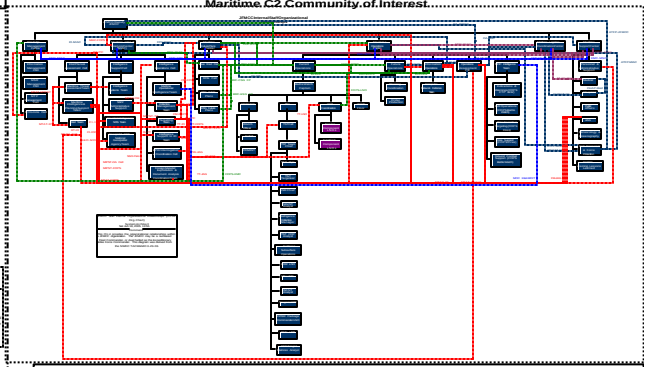


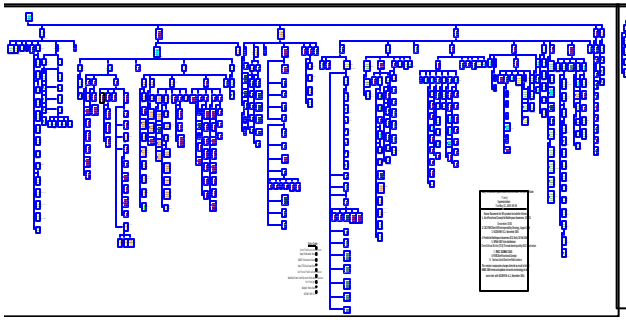


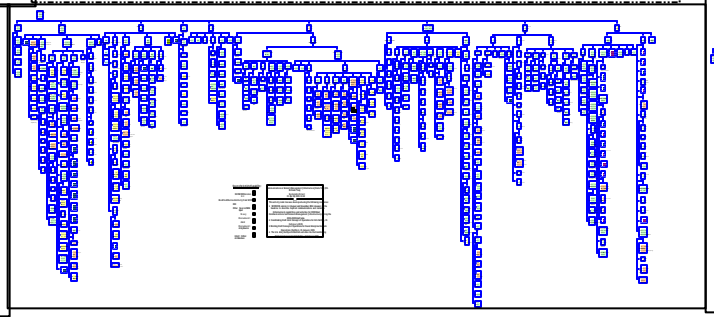


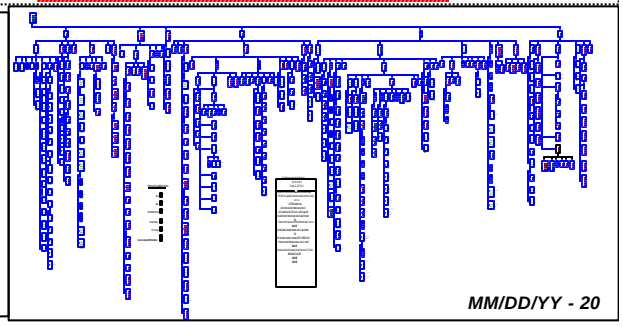






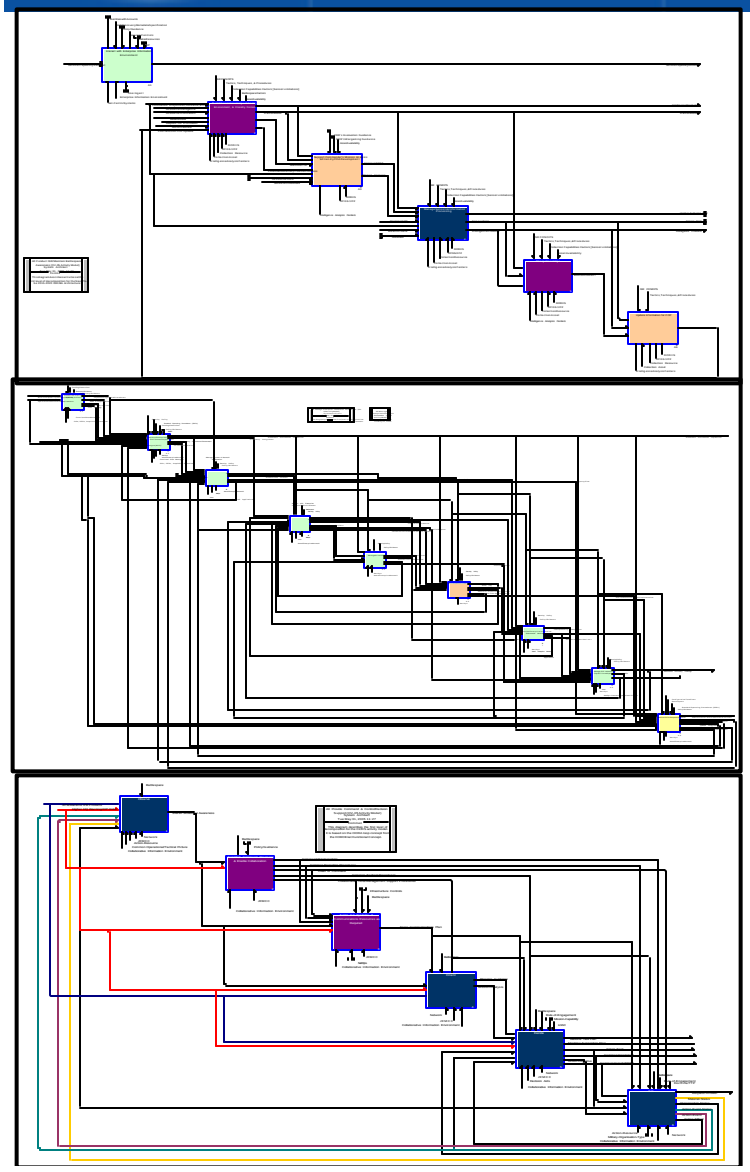






OV-5 (Activity Model)

(Scheduled for SME review)



BA/ISR – 80 Diagrams

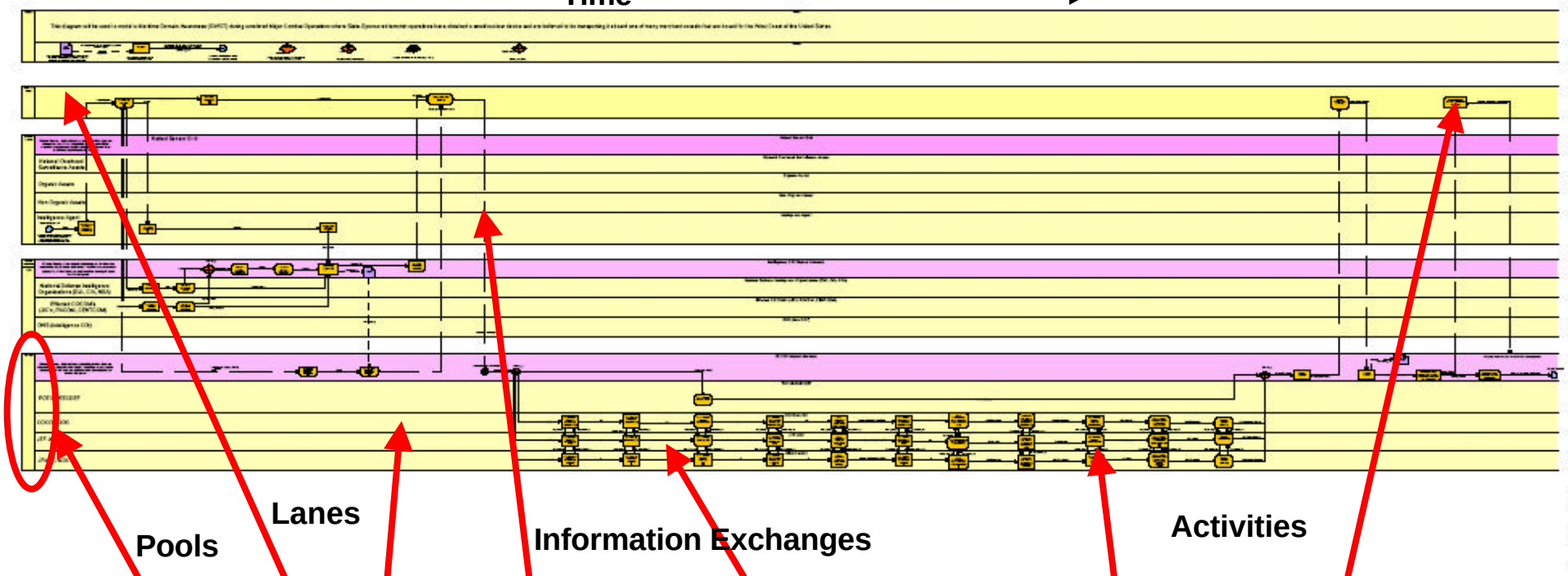
Comms&Networks/Infrostructure – 122 Diagrams

C2/Decision Support – 90 Diagrams

OV-6 (Event Trace)

(Business Process Modeling Notation)

Time

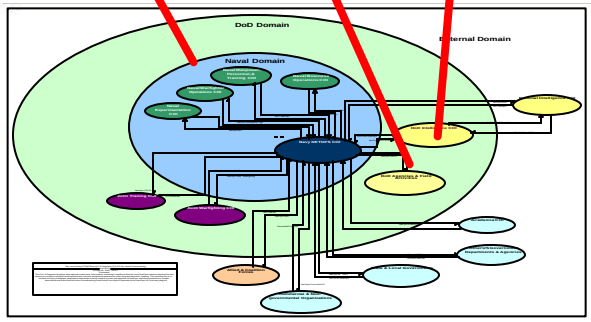


Pools

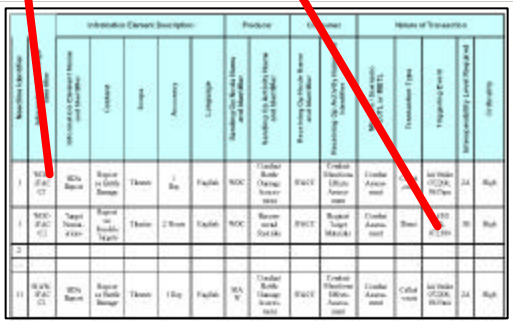
Lanes

Information Exchanges

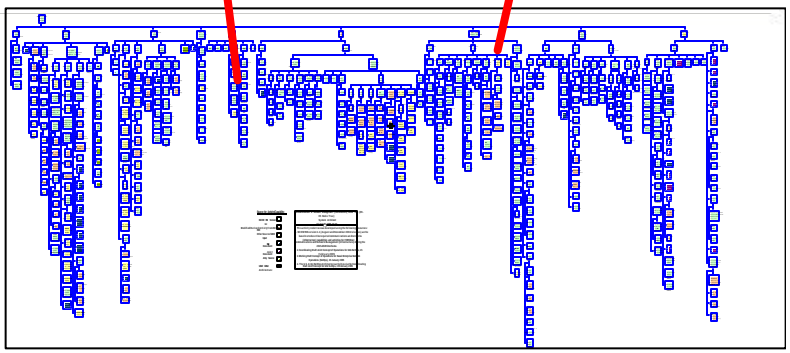
Activities



OV-2 Node Diagram



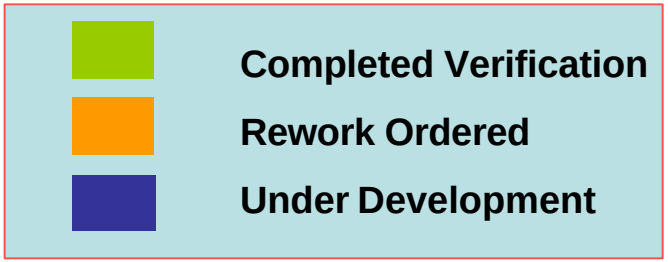
OV-3 IER Matrix



OV-5 Activity Decomp

Verification Schedule

- **27 April – AV-1, AV-2 (format), OV-1(tiers 1-2), TV-1/2**
- **9 June - OV-1(tier-3), OV-2, OV-4, OV-5 (Decomposition)**
- **25 August - OV-1(MT), OV-2(MT), OV-3(MT), OV-6(MT), OV-5 (Activity Model)**
- **22 September – AV-2, SV-1(MT), SV-2(MT), SV-4, SV-5, SV-10(MT)**



(MT) – Product related to a Mission Thread

DARS Access

(DoD Architecture Repository System)

- Access: https://dars1.army.mil/

- Request access to Community of Interest (COI) titled “FORCEnet IA" as a "Community Unit Subscriber”

DARS release to be announced by message from the FORCEnet Integrated Architecture Integration Agent (SPAWAR 05)

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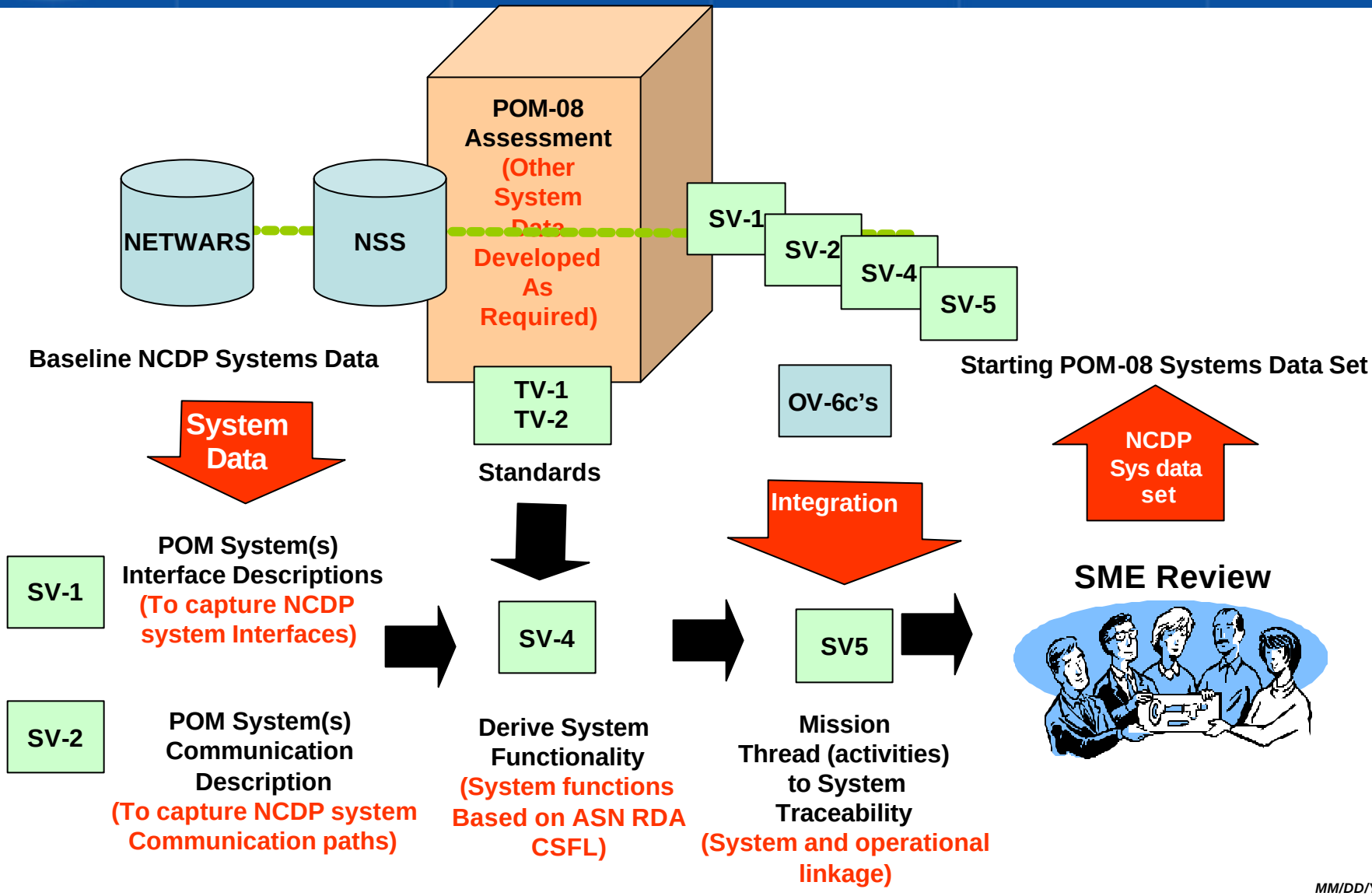
NCDP Context

- PR-07 Assessment Was Supported by the NSS and NETWARS Models Based on an Operational Scenario
- NSS Addressed Platform-to-Platform System Data Flow
- NETWARS Modeled Platform-to-Platform System Communication Paths
- NCDP Models Imply An Accepted Enterprise Architecture Composed of POR FYDP Plans
- POM-08 System Architecture Support Will Start From a Baseline Derived From PR-07 Models

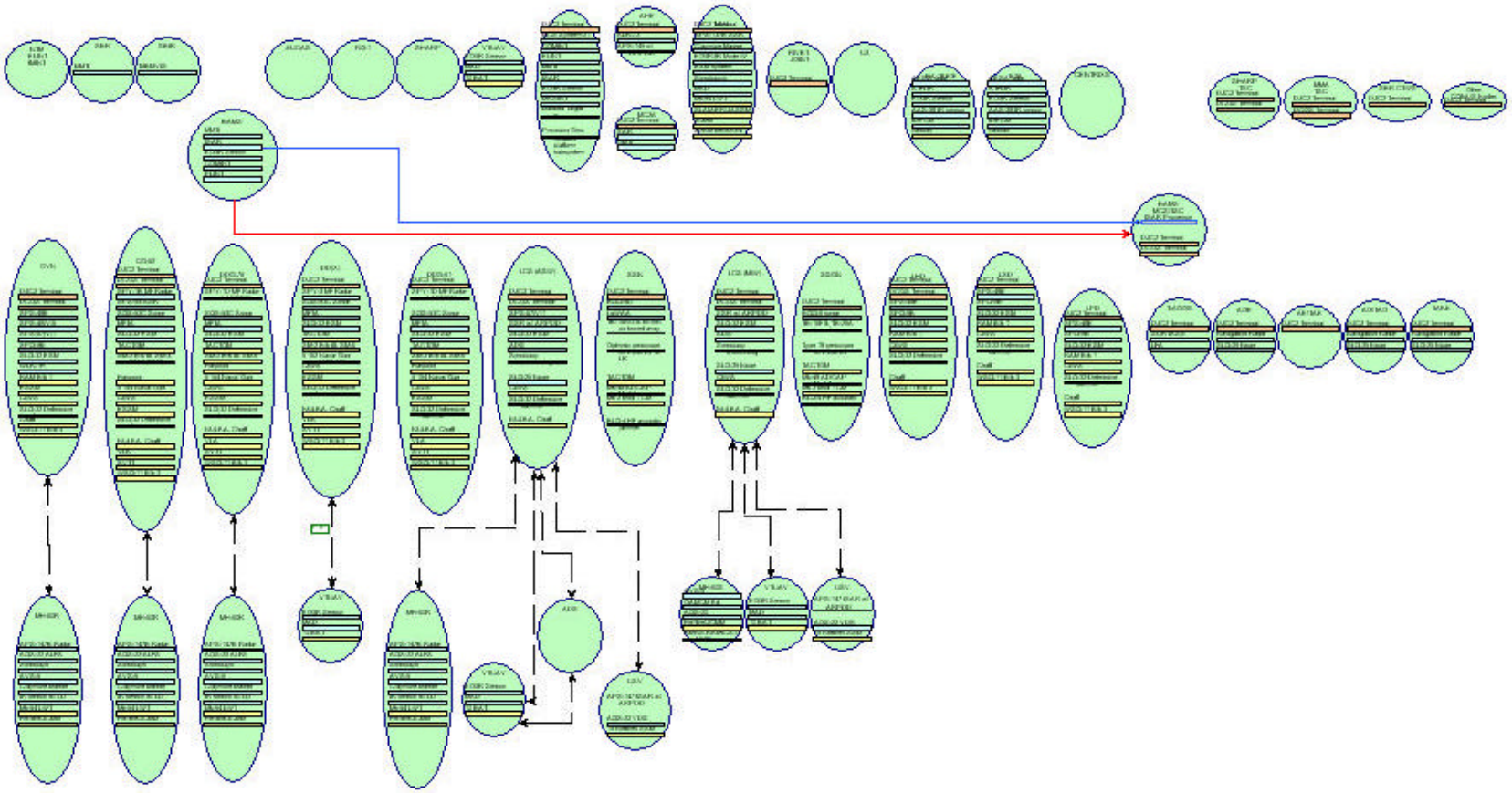
SV Development

- Capture NSS and NETWARS System Information As a Baseline System Architecture
  - Provide a Set of Svs That Can Be Used As a Starting Point
- Incorporate Developing FORCEnet To-be OV Data to Identify System Information Gaps
- Expand System Information As Necessary to Support the POM-08 Assessment
- Feed the Resulting Architecture Back to the NCDP Models
- Repeat, Retain (DARS), Reuse

Top-Level SV Support to the NCDP



Draft Initial SV-1



PR07 Baseline NSS System Nodes

NTM
SBR
SBIR
CTWS
BAMS
SHARP
AHE
ACS
MC2A
MMA
U2
RIVET JOINT
F/A-18 E/F
F-35
DJC2 Facility
DCGS Facility
CVN
CG-52
DDG-79
DDG-51
DD(X)

LCS(ASW)
LCS(MIW)
SSN
SSGN
LHD
LPD
LSD
AOE
AE/TAE
AO/TAO
TAKE
T-AGOS
BAMS MCS/TSC
MMA TSC
SHARP TSC
SBR CTWS
Other CONUS Nodes
CENTRIXS
MH-60R
VTUAV
USV
ADS
MH-60S

PR07 Baseline NSS Weapon Systems

10 BAT (SUW LCS Module)
15 Netfires SSM (SUW LCS Module)
Mk-54 LWT
SLAM-ER/JASSM
JCMM
JDAM Mk-82/3/4 (air deliverable depth bomb)
Hellfire/JCMM
AMNS, RAMICS, OASIS
Various Air-Air & Air-Ground
RAM Blk 1
ESSM
CIWS
SLQ-32 Defensive Jammer
Chaff
WSQ-11 Blk 3 (SLQ-25 Nixie, TRAF, MICM, ATT)
TACTOM

SM-2 Blk III, SM-3, SM-6 (SBT)
Harpoon
5"/54 Naval Gun
CIWS
NULKA, Chaff
VLA
SVTT
WSQ-11 Blk 3 (SLQ-25 Nixie, TRAF, MICM, ATT)
SM-2 Blk III, SM-6
5"/62 Naval Gun with LRLAP
TACTOM
Mk-48 ADCAP Mod 7
Mk2 Mod 1 CM
BLQ-4 high frequency acoustic jammer
RAM Blk 1

Note: Systems in italics not used in PR07 Scenarios

PR07 Baseline NSS Sensors/BA/ISR

Multi-band medium wave infrared sensor
MMTI Maritime moving target indication radar
ISAR
EO/IR Sensor
COMINT Communications Intelligence receivers
ELINT Electronic Intelligence
EO/IR surveillance sensor
Minaturized Magnetic Anomaly Detector
AQS-22 Variable Depth Sonar
APS-147 ISAR with ARPDD
Airborne (manned) node of the Maritime Cryptologic System-21
COMINT Communications Intelligence
ELINT Electronic Intelligence
Multi/Hyper-spectral sensor
MASINT Measures and Signatures
Masked Target Sensors
Precision Geo-location platform subsystems
ALR-73 Passive Detection System
APS-145 Radar Moderniztion Program (RMP) radar with ARPDD
SAR
GMTI
APS-137B surface surveillance radar (MMTI,ISAR,ARPDD)
Claymore Marine (EO Search)
EO/IR-IR Mode W
ESM system - ESEI, DIFM
Improved Extended Echo Ranging sonobuoy
SSQ-62 Directional Comman Activated Sonobuoy System (DICASS)
SSQ-53 Directional Frequency Analysis and Recording (DIFAR) expendable magnetic bearing sonobuoy
Advanced Magnetic Anomaly Detector (MAD)
APS-147B Radar (ISAR, ARPDD)
AQS-22 airborne low frequency sonar (ALFS)
Sonobuoys
SLQ-25 Nixie

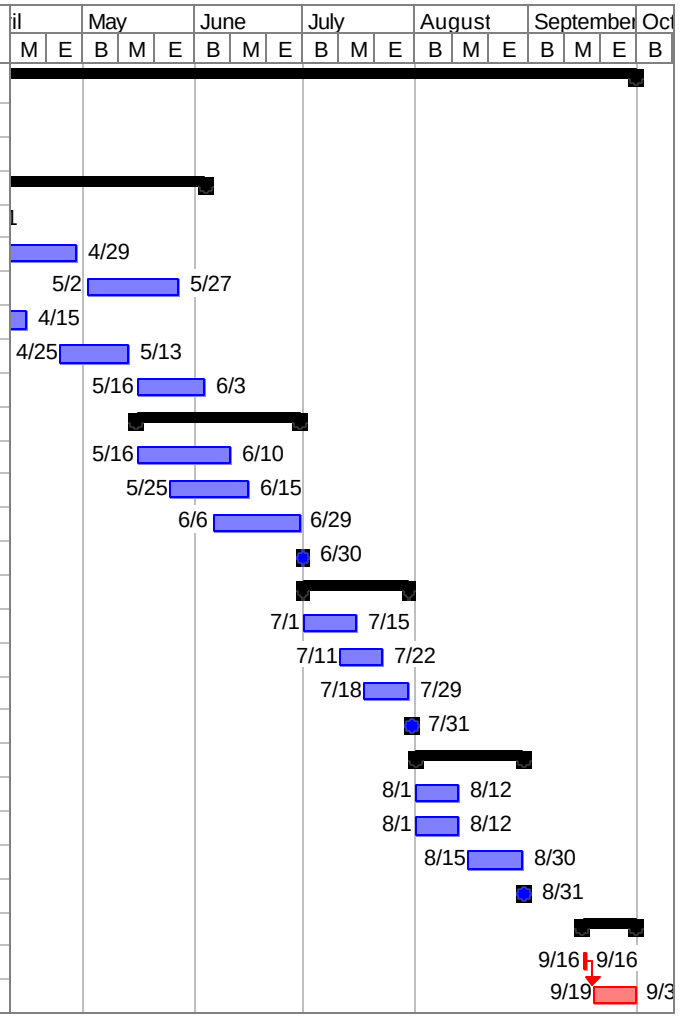
AVS-5 view-enhancing equipment (night vision googles)
Claymore Marine EO Search sensor
Infrared (IR) sensor *with laser designator (LD)*
Organic Airborne Mine Countermeasures (OAMCM) kit
AQS-20 sonar mine-detecting set
Advanced Electronically Steered Array (AESA) radar
Advanced Targeting Forward Looking Infrared (ATFLIR)
AAS-38 IR sensor
Integrated Defensive Electronic Countermeasures (IDECM)
SPS-48E Early Warning Radar
SPS-49(V)5 long-range, two-dimensional (range, bearing) air search radar
SPS-67(V)1 low-flyer air search radar with surface ARPDD
SPQ-9B radar for surveillance and tracking of anti-ship cruise missiles
SLQ-32 Electronic Support Measures (ESM) system
WLR-1H Passive over-the-horizon cued detection and classification system
SPY-1B Multifunctioin Radar (TBMD, Early Warning Air Search & Track, Surface Search, Fire Control, ARPDD
SPS-55 Surface Search Radar
SQS-53C Sonar
Multi-Function Towed Array (MFTA)
SLQ-32 Electronic Support Measures (ESM) System
SPY-3 Multifunction Radar (Early warning air search & track, surface search, fire control, counter-battery, ARPDD)
SQS-53C Snar
Multi-Function Towed Array (MFTA)
Kingfisher mine avoidance sonar
SPS-67(V)1 Air Search Radar
Surface Search Radar with ARPDD
ADS Advanced Deployable System
SLQ-25 Nixie
BQQ-5D
LgWAA Lightweight wide aperture array
TB-16NG and follow-on towed arrays
Optronic periscope w/ ESM direction drinding (DF) and laswer ranging
BQQ-6 sonar
TB-16F and TB-29A towed arrays
Type-18 persicope w/ ESM DF
Surveillance Towed Array Sonar System (SURTASS)
Low Frequency Active (LFA)
Navigation Radar

PR07 Baseline NSS C4I Systems

- TSAT
- MP-CDL
- JTRS
- Common Data Link
- Tactical Internet
- Link-16(relay)
- TCDL (to launch platform for control and sensor data download)
- Comms Relay (for ADS data to LCS)
- TCDL (to LCS for control and sensor data download)
- CEC
- Hawk Link
- MIDS (Link-16)
- Joint Command and Control
- Distributed Ground Station - Navy (DCGS-N)
- Data Link and Control to BAMS
- VTUAV Link
- Tactical Control Station (TCS) (BAMS/VTUAV/USV Control)
- USV Link

SV POA&M

ID	Task Name
1	**Fn POM-08 Systems View Development**
2	**Determine POM-08 system data needs**
3	Collect and understand ISR, C2DS and C&N operational information
4	**Collect and derive systems Information from the NCDP models (NSS & NETWARS)**
5	Understand the NSS model
6	Assess and get acess to the NSS model
7	Collect and derive system information from the NSS model
8	Understand the NETWARS model
9	Assess and get access to the NETWARS Model
10	Collect and derive system information from the NETWARS model
11	**Baseline current system information in the the NSS models**
12	Depict the systems interface description (SV-1) in the NSS model
13	Depict the systems communication path (SV-2) in the NETWARS model
14	Describe the systems functionality (SV-4) and correlate with Fn standards (TV-1)
15	**Deliverables: Initial SV-1, SV-2, SV-4**
16	**Integrate the initial SVs with Fn Operational Views (OV5/OV-6)**
17	Correlate the ISR activities to the applicable system functions
18	Correlate the C2DS activities to applicable system functions
19	Correlate the C&N activities to applicable system functions
20	**Deliverables: initial SV-5**
21	**SME review and validate the initial integrated architecture**
22	System SME review of initial SV-1, SV-2, SV-4
23	Operational SME review of initial SV-5
24	Revise the SVs wrt the SME reviews
25	**Starting set of system data to support POM-08 assessments**
26	**System data refinement to the NCDP models**
27	System data updates to the NSS and NETWARS model
28	Document systems data gaps that affect POM study areas



FY-05 Schedule

- Baseline Current System Data From NCDP Models (NSS & NETWARS)
  - June 05: Initial SV-1/2/4
- Integrate Initial SVs With Fn Operational Views (OV-5/6)
  - July 05: Initial SV-5
- SME Review of System Views
  - SPAWAR Domain CHENGS and MCSC
  - OV Correlation Review With OV Team
- Provide Starting Set of System Data to Support POM-08
  - August 05: Revised SV-1, 2, 4, 5
- Identify Modeled System Data Gaps
  - Sept 05:

FY-06 Way Ahead

- Develop Additional System Data to Support NCDP Models As POM-08 Direction Firms Up
- Begin to Merge the SV Baseline (As-Is/To-Be) With a Service-Oriented Future View (Target)

Agenda

- **FORCEnet Architecture Overview**
  - CDR Pat Roche, SPAWAR
- **Governance and Operational Architecture**
  - Mr. Larry Core, NETWARCOM
- **System Architecture**
  - CDR Pat Roche, SPAWAR
- **Technical Architecture**
  - Mr. Mike Stewart, SPAWAR
- **Reference Model/SOA**
  - CDR Pat Roche, SPAWAR
- **Questions**

FORCEnet Standards Focus

- DoD Architecture Framework 9 February 2004
- Operational Views (OVs), System Views (SVs), and Technical View (TV-1 and TV-2) are developed
- FORCEnet TVs are Net-Centric Enterprise Level Standards
  - Interconnectivity
  - Interoperability
    - Navy-wide
    - Joint Forces
    - Coalition
  - Information Sharing—Publish/Subscribe

Sample FORCEnet TV

Fn Service Category	Standards	Function of the Standards	Services of the Standards
Data Management Services			
SQL Database	Note--OACE lists several additional SQL STDS	SQL Data Base Management Standards--Sharing of data between applications; application clients and database Servers.	Supports independent management of data shared by multiple applications.
	ISO/IEC 9075-1:1999	Part 1: Framework (SQL/Framework)	
	ISO/IEC 9075-2:1999	Part 2: Foundation (SQL/Foundation)	
	ISO/IEC 9075-3: 1995 Information Technology - Database Languages.	Information Technology - Database Languages	Supports exchange of data between applications, and to/from external environment.
	ISO/IEC 9075-4:1999	Part 4: Persistent Stored Modules	
	ISO/IEC 9075-5:1999	Part 5: Host Language Bindings	
	ISO/IEC 9075-10:1999	Part 10: Object Language Bindings (SQL/OLB)	
	ISO/IEC 13249-3-1999	Management of Multimedia	Support SQL Multimedia and application packages

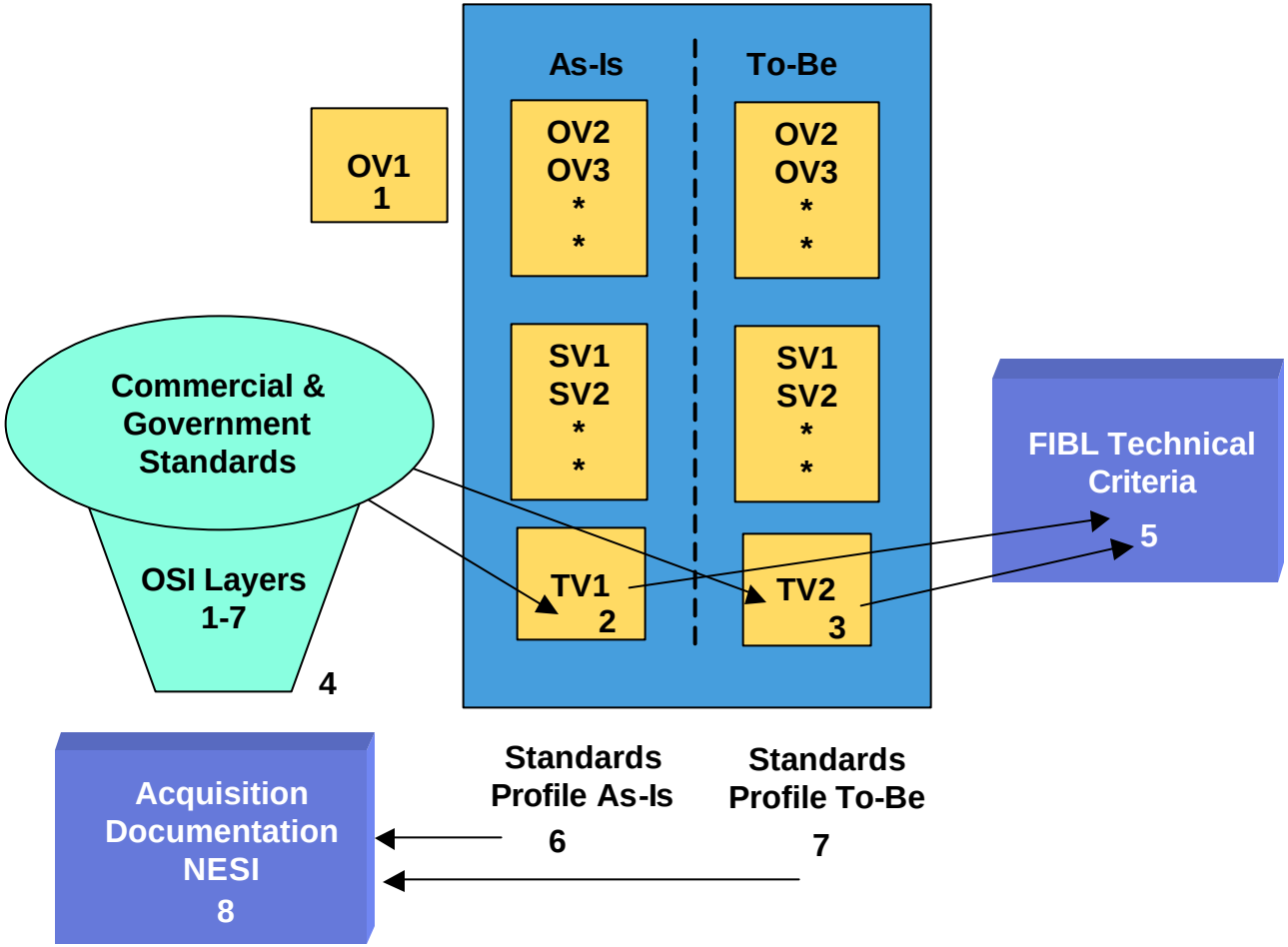
FORCEnet Standards Categories

- Communications and Networks
- Enterprise Services
- Applications
- Human System Integration
- Information Assurance
- Quality of Service

TV Development Method

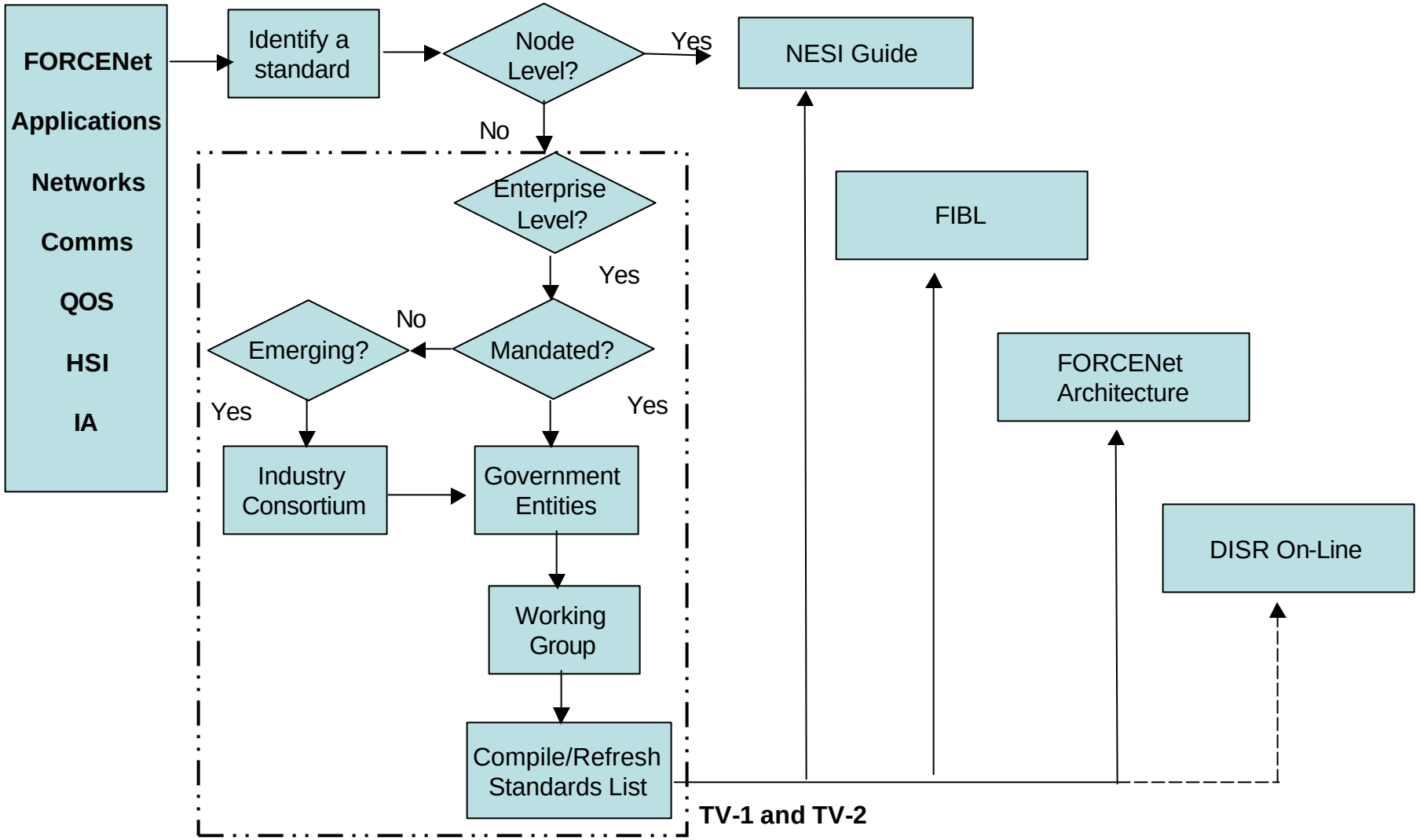
- Virtual Standards Working Group
- Via E-mail and Teleconferences Per Charter
- Similar to Industry Approach i.e. World Wide Web Consortium (W3C)
- Use Existing Meetings for Ad Hoc Standards Meetings
- Peer Group Reviews by Technical Working Groups With SME's in Each Standards Category
- Industry Reviews

Overview of Product Development Process



Revised As Required to Keep Pace
With Changing IT Standards in the Commercial Market

Standards Selection Process



FORCEnet Standards History

Standards Timeline

Fn Standards TV-1/2 Mar 05

Fn A&S Vol. II, Standards Dec 04

Fn Standards WG Sessions Sep 04 – Mar 05

Fn Arch Conference, Monterey May 04

Fn A&S Ver. 1.4 – Rel. OPNAV/N6/7 Apr 04

Fn Arch Conf, Quantico Dec 03

Nov 03 Fn A&S Version 1.1- Release NNWC

Sep 03 Fn Architecture Conference, New Orleans

Jul 03 Fn Architecture Conference, Pax River

Jun 03 Fn A&S Version 1.0 - Release DoD-Wide

May 03 Fn Architecture Conference, Norfolk

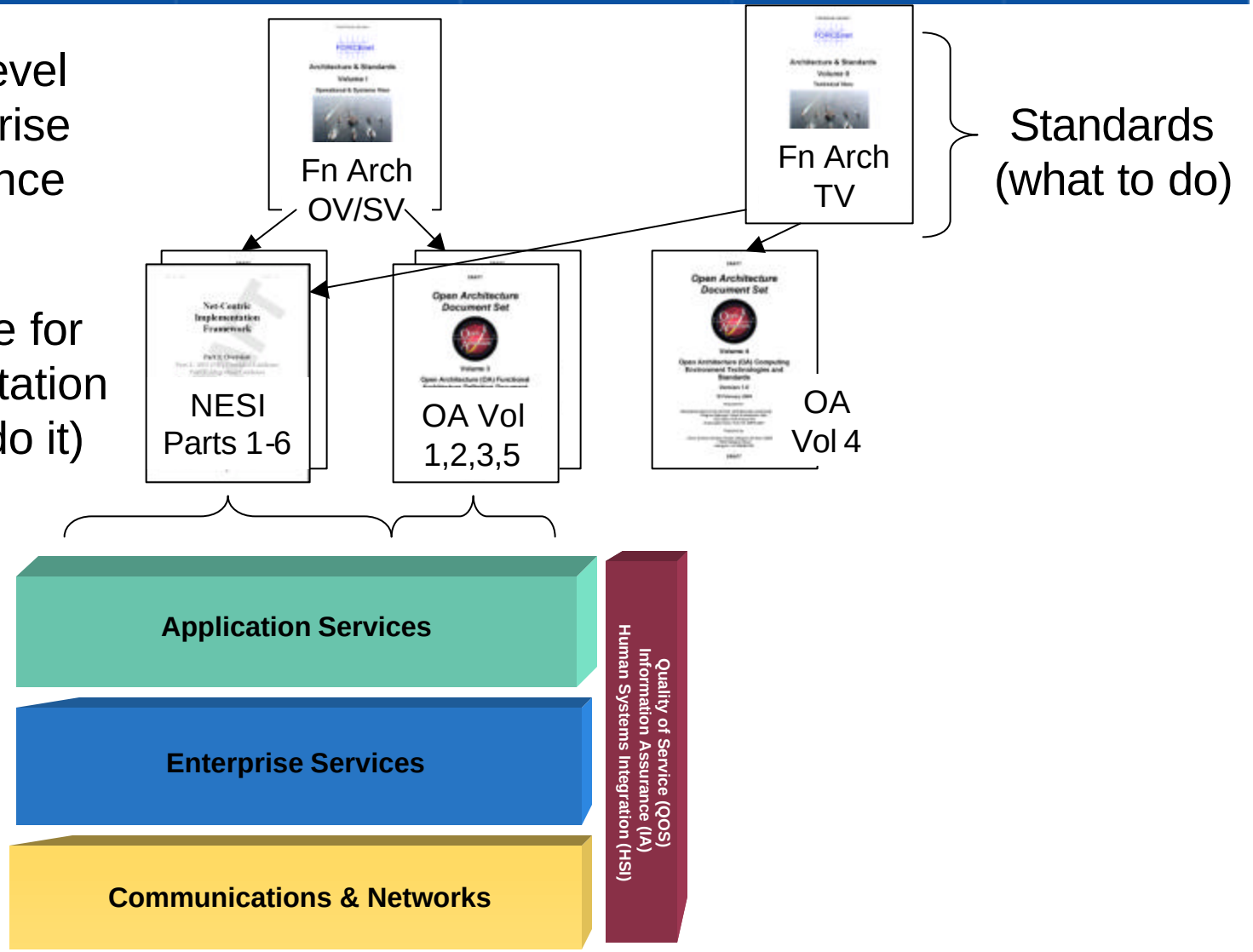
Alignment

- Ensure FORCEnet Standards Continue to Be Aligned With Related Efforts and Tools
- OACE, FIBL/FIT, DISR, and NESI
- Two Broad Alignment Areas
  - Content
  - Tools

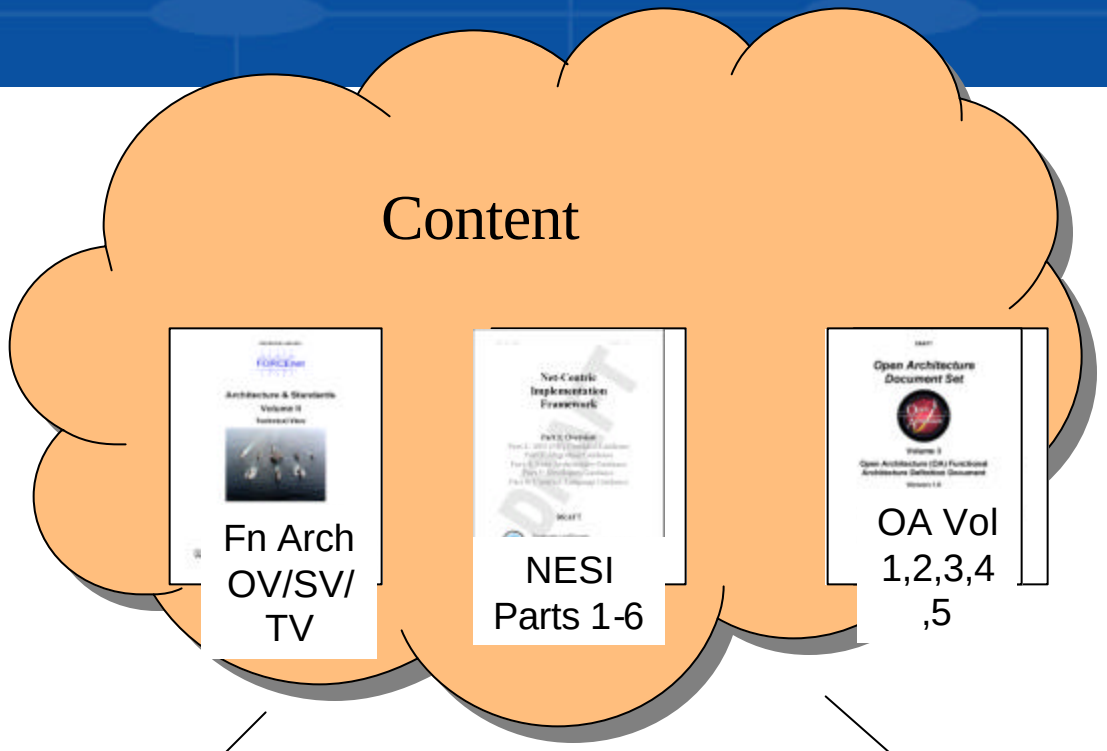
Content

Top-Level Enterprise Guidance

Guidance for implementation (how to do it)



Tools



DARS

•DoD Architecture repository

FIBL/FIT

•Program Information
•Standards Profiles
•Acquisition guidance
•Enterprise Architecture

JCPAT-E/DISR

•KIPs
•TV-1
•Interoperability requirements memo generator Repository

Way Ahead

- FORCEnet TVs approved by Verification Board in April 2005
- Update to keep consistent with DISR and Industry standards
- Via ASN RDA CHENG, investigate including FORCEnet and service unique standards in DISR to support Milestone decisions
- Continue technical standards alignment with OAET, NESI, FIT
- Explore merger of TVs and A&S Vol II

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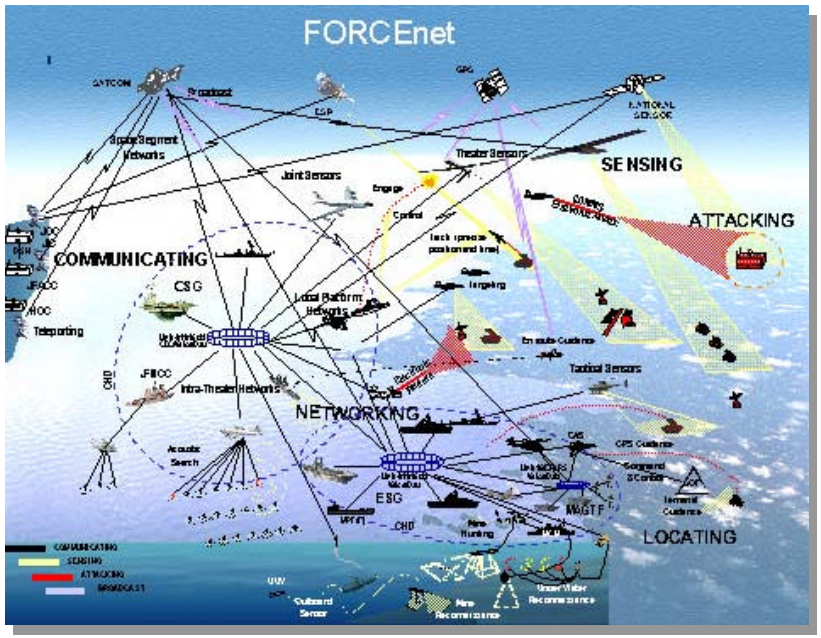
Net-Centric Impact on Architecture-Based Planning

- Today's DODAF is System-Centric
  - Tight Coupling Between Operational Activities and System Functions
  - Operators are Tied Directly to Systems
  - System Technology Visible to Operator

- FORCEnet's Net-Centric Architecture Has a Service Orientation
  - Operational Activities Mapped to Services
  - Operators View Services
  - Underlying Systems Not Visible to Operator

Why Will FORCEnet be Deployed as a Service-Oriented Architecture?

- Industry Has Embraced Service-Oriented Approaches
- GIG Is Being Developed to Optimize Support for Distributed Services Implemented As SOA
- Net-Centric Enterprise Services (NCES) Are Being Developed As “Core Enterprise Services” for All of DoD
- Naval Leadership Has Committed to Congress and Others That FORCEnet Will Be Deployed As a DSA Implemented As SOA
- Networks Are Migrating to Internet Protocol (IP) Which Is Best Exploited by a DSA

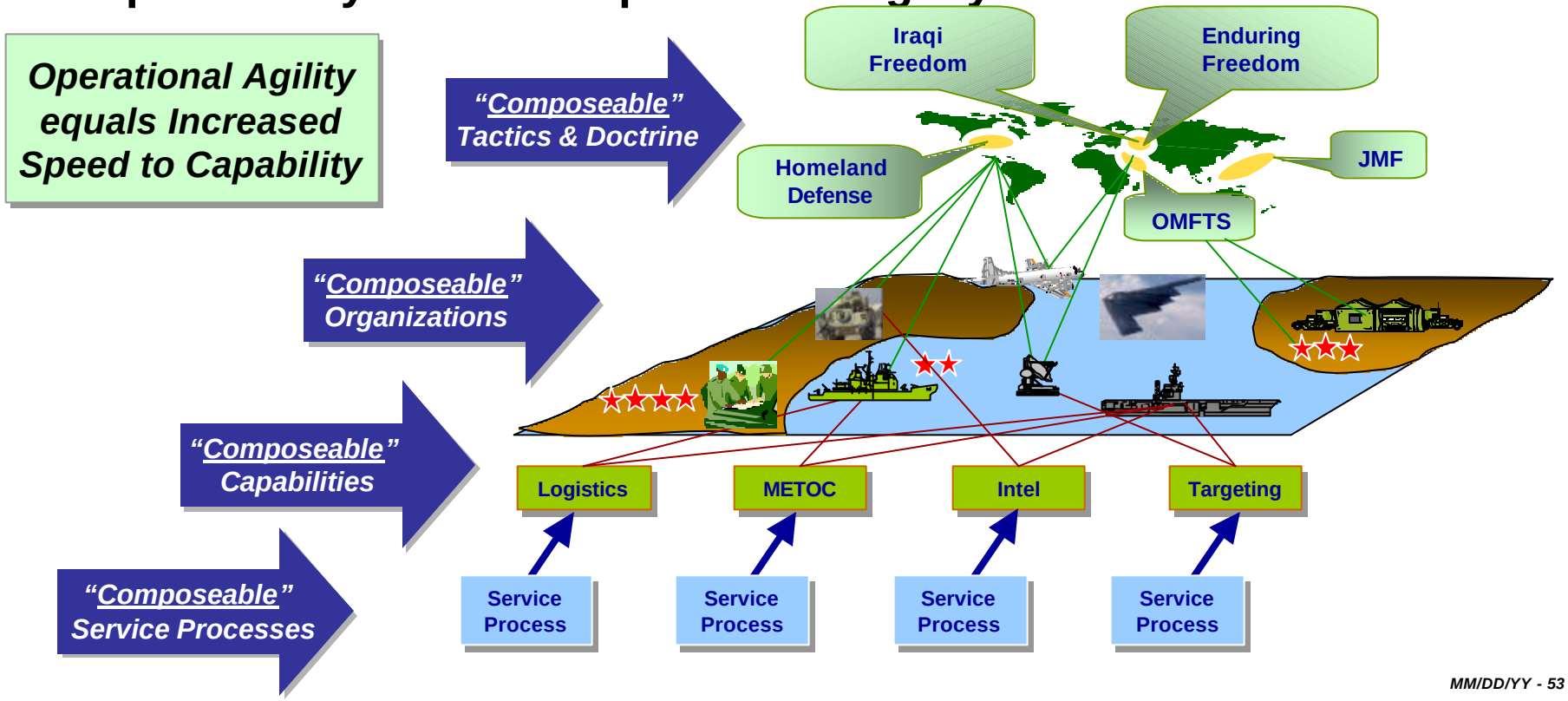


Benefits of a Service-Oriented Architecture

- *Service-Oriented Architectures* (SOA) Are a Cost-Effective Way to Unlock Business Processes, Data, and Other Valuable Assets Locked Up in Legacy Systems and to Use Them to Deploy New Information Capabilities.
- The Standards-Based Reusability of a SOA Allows Rapid Composability of New Information Capabilities.
- A SOA Reverses the Default Dominance of Information Systems Driving Operational Capability. A SOA Lets Operators Drive the Services and the Services Drive the Systems.
- A SOA Provides Increased *Operational Agility.*
  - The Ability to Respond Quickly and Efficiently to Change

Distributed Services Provide Composeable Capabilities

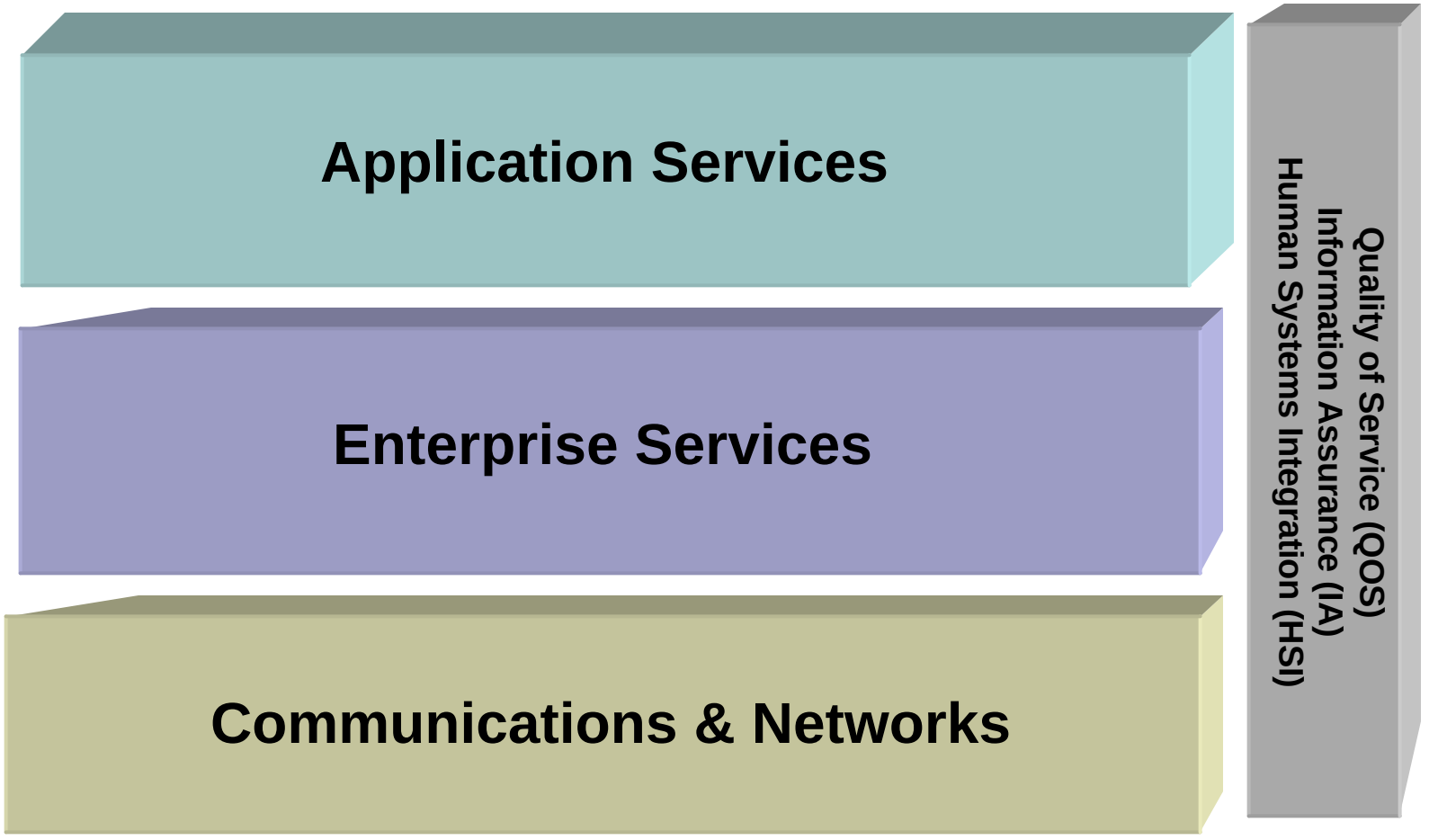
- **Ability to Rapidly Create and Recreate From a Broad Array of Components Resident Throughout the Net-Centric Environment the Information Capabilities That Meet a Commander's Immediate Warfighting Needs**
- **Composeability Leads to Operational Agility**



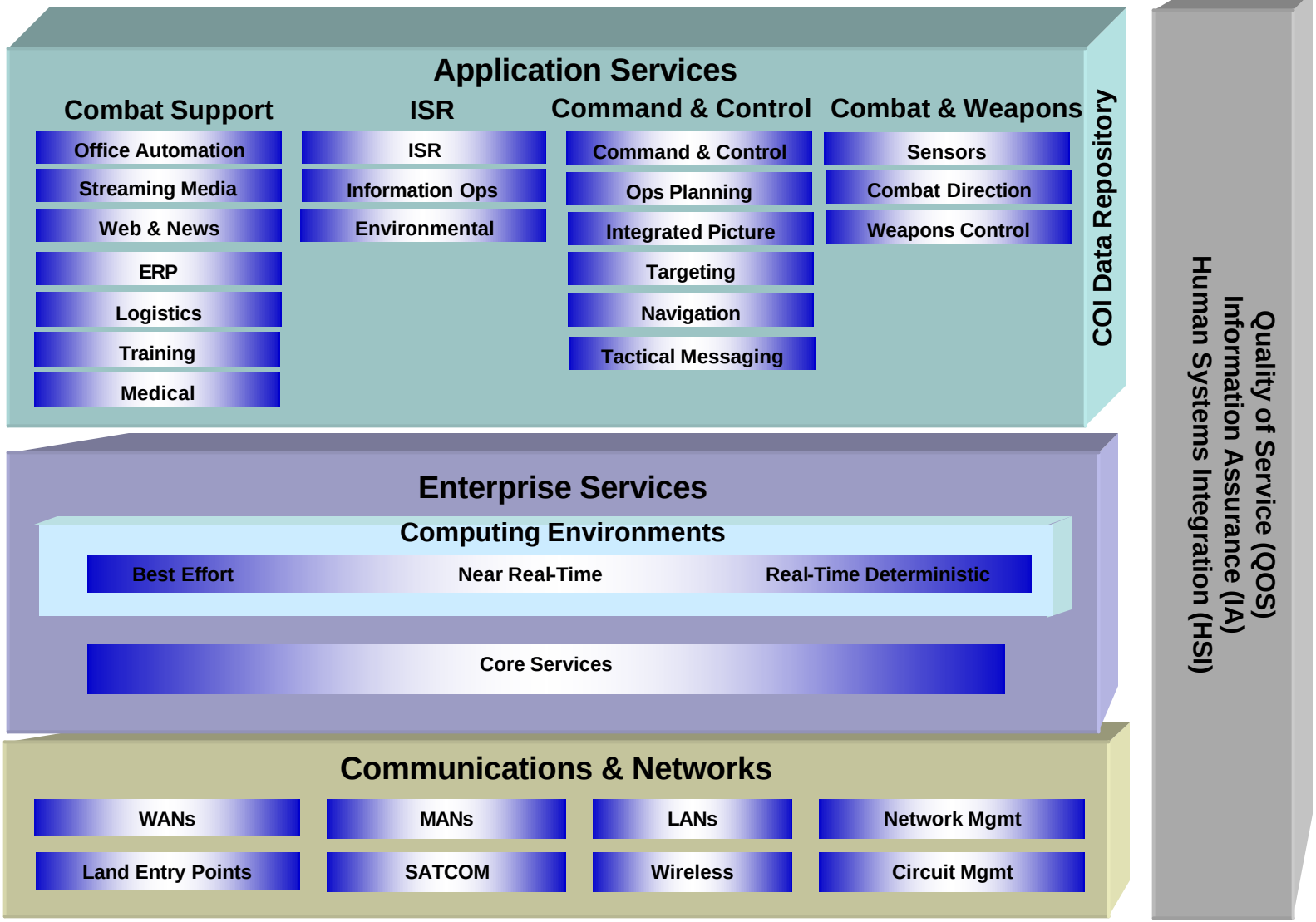
FORCEnet Reference Model

- Supports Development of the FORCEnet Architecture
- Provides a Framework for Understanding the SOA Quality of the Target Architecture
- Identifies the Layers of a Component-based Architecture and Relevant Supporting Technologies
- Outlines the Elements that Support the Implementation of FORCEnet
- Provides the Foundation to Advance the Re-use of Technology and Component Services

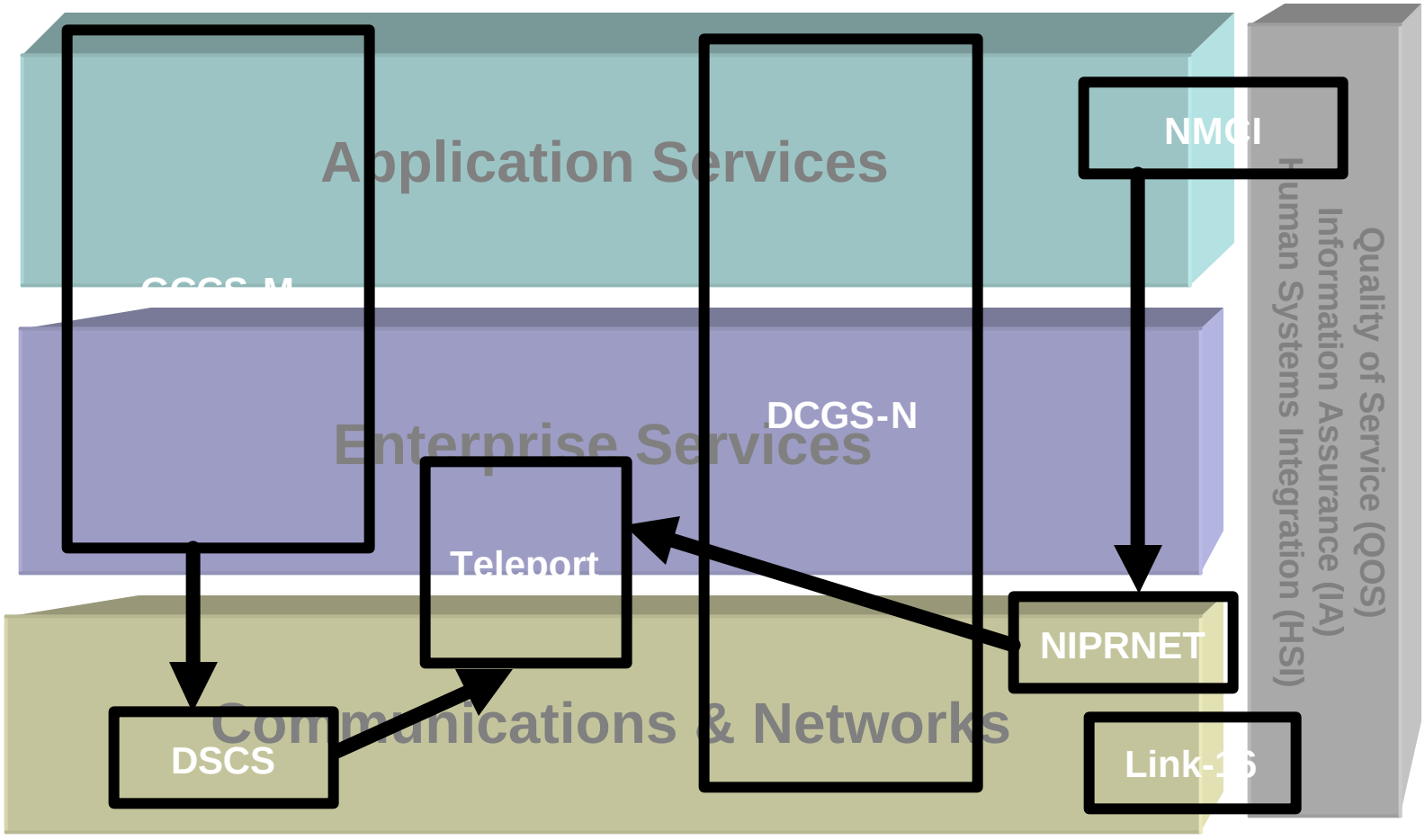
FORCEnet Reference Model Level 0



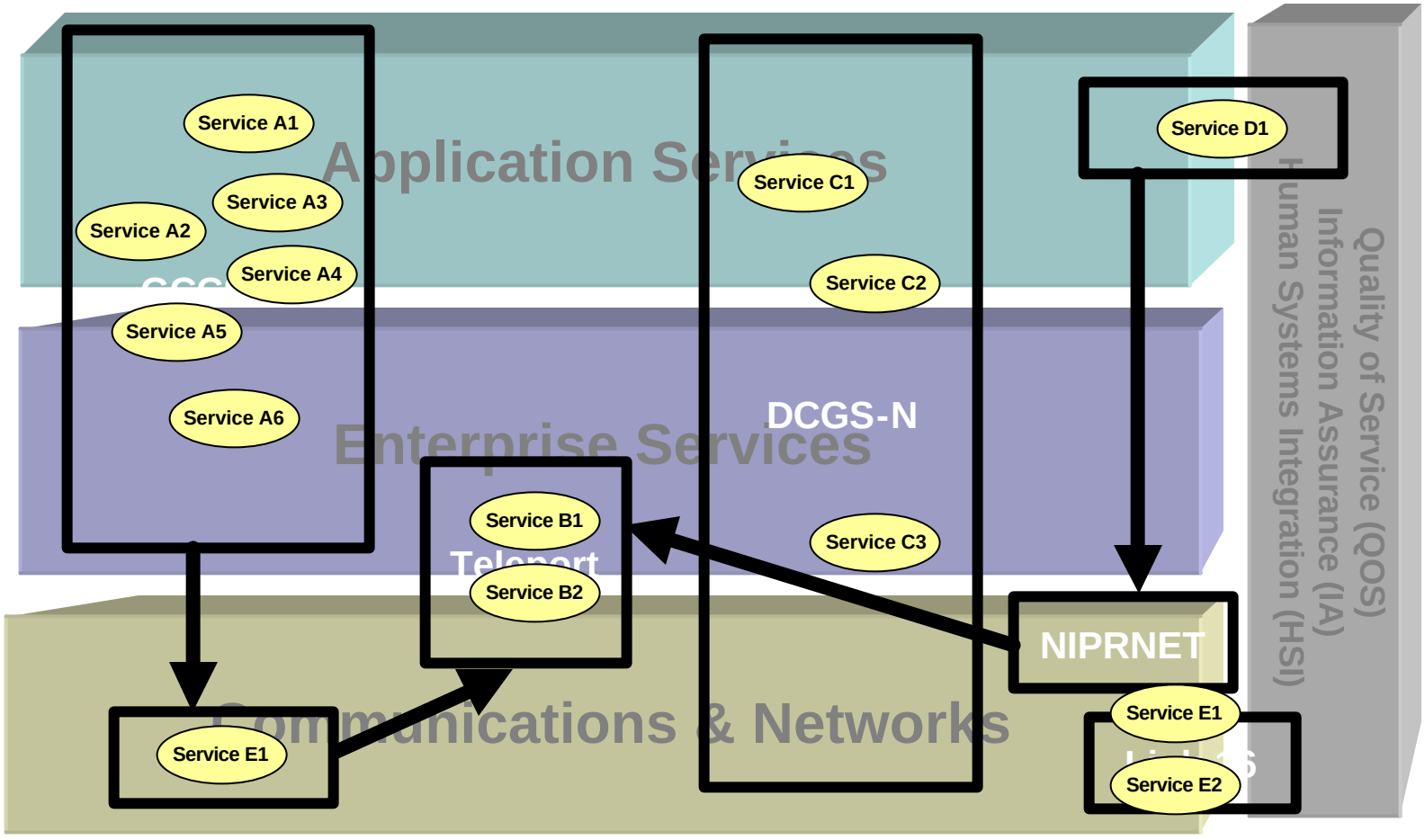
FORCEnet Reference Model Level 1



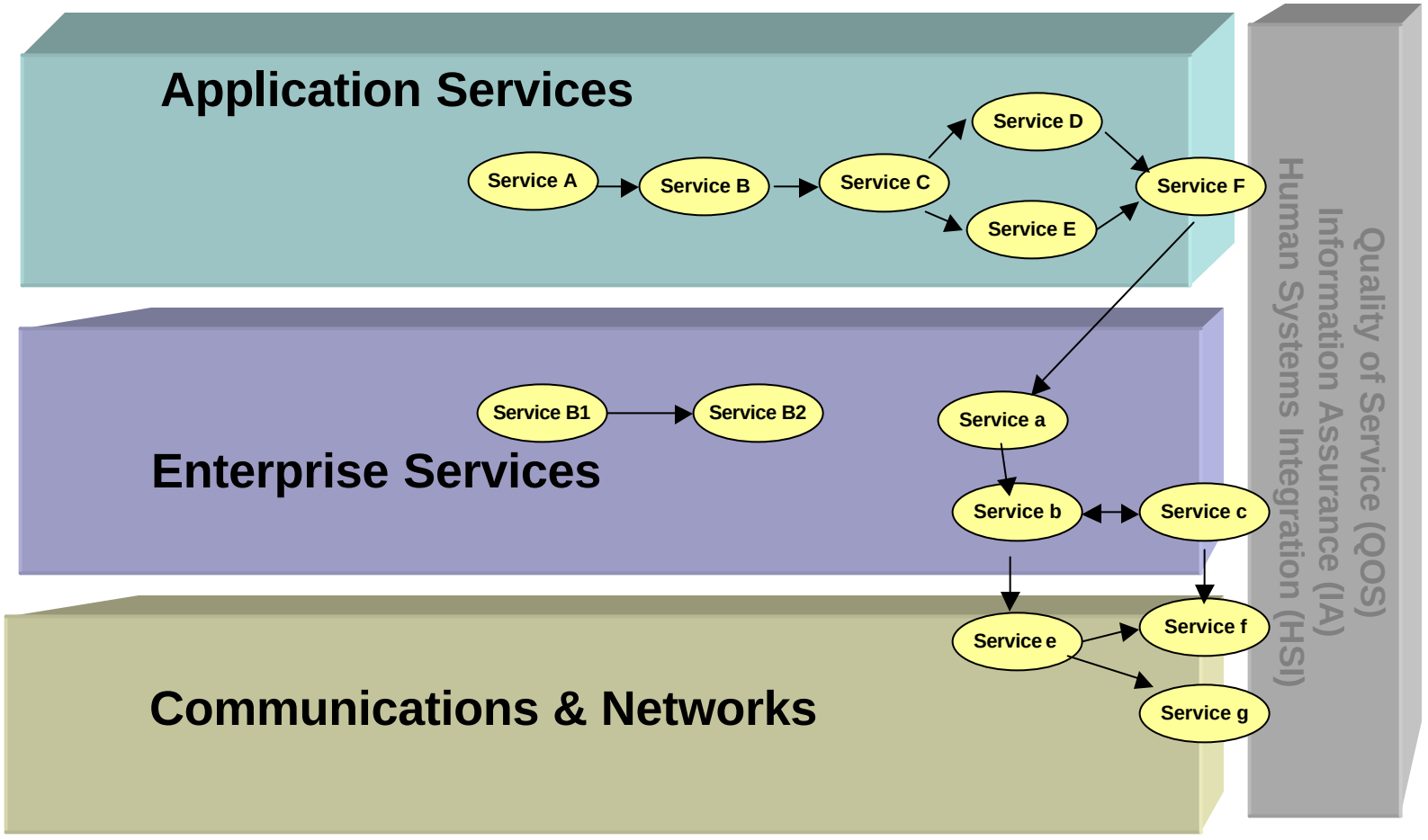
Systems Mapped to the FORCEne Reference Model



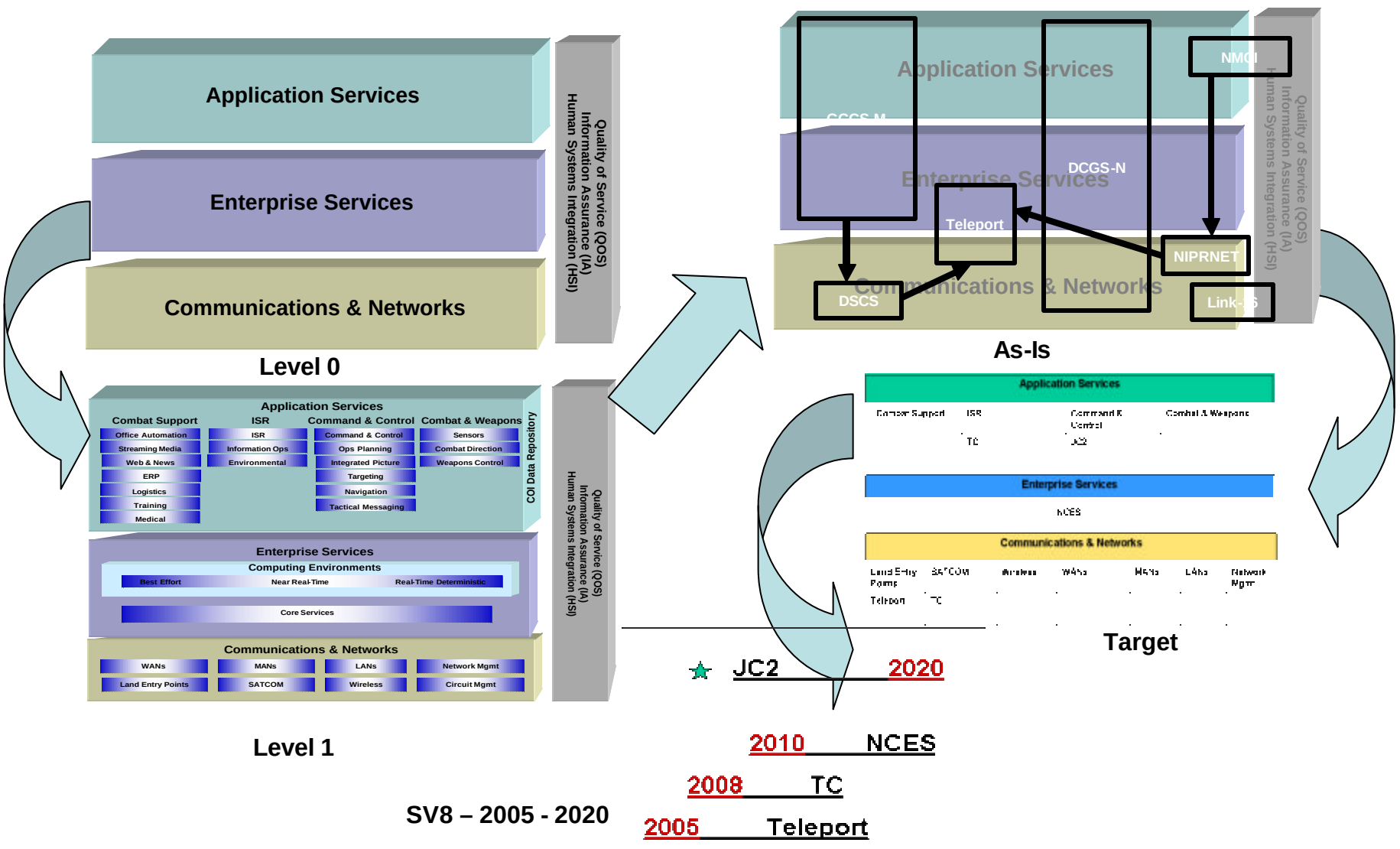
Functions Mapped to the FORCEnet Reference Model



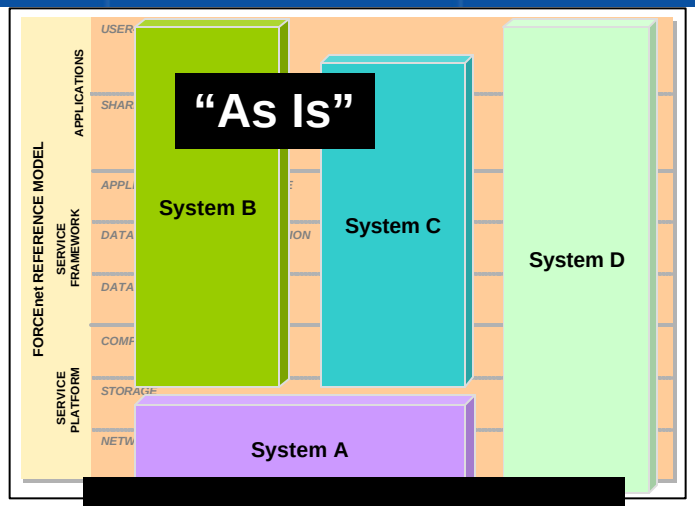
Services Mapped to the FORCEnet Reference Model



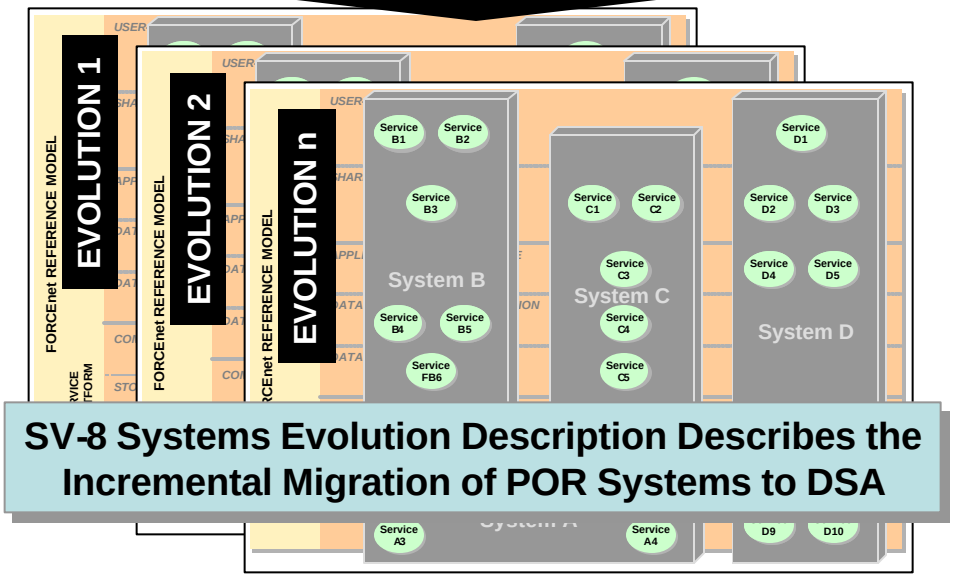
FORCEnet Reference Model Process



FORCEnet Process – Bringing it all Together

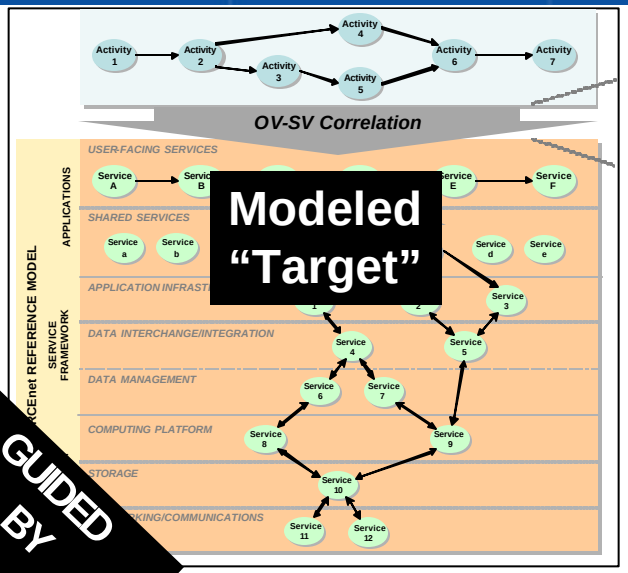


MIGRATE TO



SV-8 Systems Evolution Description Describes the Incremental Migration of POR Systems to DSA

GUIDED BY



FOCUSED BY

TV-1 Technical Standards Profile Describes Applicable Standards

Incremental Update

TV-2 Technical Standards Forecast Forecasts Expected Changes in Standards Over Time

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Backup

Review

- The A&S Vol II and TV-1 and TV-2 have been compared and cross-walked with:
  - JTA 6.0/DISR
  - Open Architecture Computing Environment (OACE)
  - JTA Army 6.0
  - Command and Control Enterprise Reference Architecture (C2 ERA)
  - Maritime Cryptologic Technical Architecture (MCTA)
  - Marine Corp Transformational Communications Architecture (MCTCA)

Participants

- ASN RDA CHENG
- NETWARCOM
- Marine Corp Systems Command
- OPNAV
- NAVAIR
- NAVSEA
- NUWC
- SPAWAR System Centers SD and CHS
- NSWC Dahlgren and PHD
- Navy Center for Tactical Systems Interoperability (NCTSI)
- PEO IWS
- PEO C4I & Space
- National Defense Industry Association (NDIA)
- FORCEnet Consortium

Participants

- Advanced Information Engineering Services, Inc.
- Advanced Programming Concepts, Inc.
- Afloat Training Group Atlantic
- AltaTek
- American Systems Corp
- Anteon
- AT&T Government Solutions.
- BAE SYSTEMS
- BBNT Solutions LLC
- BCI, Inc
- Boeing
- Booz Allen Hamilton
- CACI
- Center for Naval Analyses
- Cisco Systems
- ComGlobal
- Computer Associates
- Computer Sciences Corporation
- CSC Advanced Marine
- DCS CORP/PMA-209
- DigitalNet
- DTI Inc.
- Dynamics Research Corp.
- Eagan, McAllister Associates, Inc.
- EDO Corporation - Combat System Division
- EDS
- EMC
- EMSoftware Solutions
- Falconwood
- Fuentez Systems Concepts, Inc.
- Galaxy Scientific Corp.
- General Dynamics
- Harris Corporation
- Hileman & Associates
- HYPRES, Inc.
- IBM
- Intelesis
- Johns Hopkins Univ. APL
- L-3 GSI
- Lava Computer MFG
- LinQuest Corporation, Communications and Software Solutions Division
- Lockheed Martin
- ManTech
- Mercury Computer Systems, Inc
- Microsoft Corporation
- MITRE Corporation
- Modulant
- Northrop Grumman
- MITRE
- Pathfinder Solutions LLC
- PEC Solutions
- Pirad
- PRTM
- Raytheon
- SAIC
- Strategic Insight
- SysTechForum/073
- The Boeing Company
- Titan Corporation, Aviation Engineering Group
- Titan/CEG
- Unisys Corporation
- Verizon
- ViaSat, Inc

The Numbers

- Received 246 comments on standards over two years
- A&S Vol II
  - 3 released versions
  - 2 internal updates
  - Currently on Version 1.5
- March 05 FORCENet Standards WG review of TV-1 and TV-2, 44 participants in teleconference
  - 69 comments
  - 48 comments incorporated
  - 21 adjudicated with Fn Standards WG
  - Moved IPV6 from emerging to mandated
  - Need to work with DISR on a Fn standards profile as a Community of Interest initiative for Navy and Marine Corps